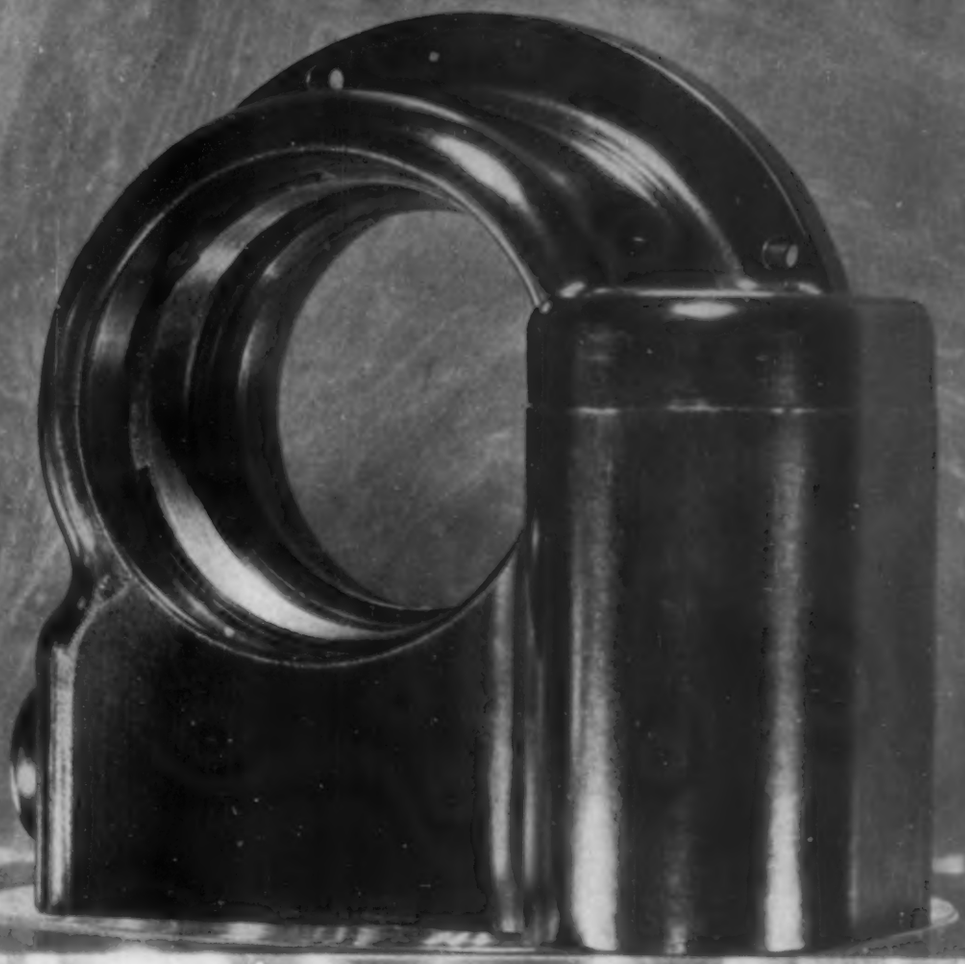
June 1934

Vol. X No. 6



Plastic Products

A phenolic molding on a base of clear cast phenolic, with a background of sheet pyroxylin, photographed by Akron Photos.

THE OUTSTANDING

BLACKS

OF THE PLASTIC INDUSTRY

Suggest as a source . . .

Calco

CONDENSATION

BLACKS

TRUE TO THEIR PURPOSE

FOR
THERMO PLASTICS
THERMO CURING PLASTICS
MOLDING POWDERS
LAMINATING VARNISHES
CASTING RESINS

THE
CALCO CHEMICAL COMPANY
INCORPORATED
BOUND BROOK
NEW JERSEY

BOSTON · PHILADELPHIA
NEW YORK · CHARLOTTE
CHICAGO

A UNIT OF AMERICAN CYANAMID COMPANY

a feather in CATALIN's Cap!

preparing their recent new Hardware mer-
ndiser (shown above), The Washburn Co.,
nufacturers of Androck kitchen hardware,
Catalin an appreciated tribute. If you will
r in mind that on a display of this character, the copy area is
ited—and that only the most important sales argument can be
anced—this reference to *Catalin* becomes even more significant.
repeat this reference in the company's own words . . . "Androck
WEL Hardware . . . Handles of Genuine *Catalin* . . . Beautiful—
rmanent . . . Cannot chip, peel or burn . . . Color goes clear
ough." Study the display for a moment more and you will note
each type of utensil is mounted with its *Catalin* handle promi-
tly featured to the top, in full view—sound merchandising!
drock takes advantage of the fact that *Catalin* possesses eye-
eal as well as utility value.

TALIN is readily adaptable; excessive mold charges being
ent. It machines similarly to brass, without requiring special
ls and equipment. It is non-inflammable, highly acid resistant,
rless and tasteless. CATALIN, because of its unique merchan-
ng attributes, deserves your investigation.

MERICAN CATALIN CORPORATION
ONE PARK AVENUE, NEW YORK

Branch Sales Offices:
AGO DETROIT PHILADELPHIA PROVIDENCE LOS ANGELES NEW HAVEN

Plastic Products

Contents June 1934

Laminated Urea Resins
By H. E. Stockfisch 210

Life of Drills on Plastics Increased Five Times
By C. E. Greenawalt 214

Odorless Resin Products
By G. E. Landt 219

A Series on Solvents and Plasticizers
By Dr. William M. Grosvenor 221

Plastic and Coating News 229

Plastic Patents 237

Indexed in the Industrial Arts Index and the Engineering Index Service

Volume X **Number 6**

NRA MEMBER U.S. WE DO OUR PART

PLASTIC PRODUCTS is published monthly by Plastics Publications, Inc. Williams Haynes, *Chairman of the Board;* R. C. Gilmore, Jr., *President;* Robert C. Gilmore, *Vice-President;* Malcolm H. Frost, *Secretary;* William F. George, *Treasurer.* Published on the first day of each month at E. Stroudsburg, Pa., and printed for the publishers by the Hughes Printing Company. Entered as second class matter at the Post Office at E. Stroudsburg, Pa., under the act of March 3, 1879. Subscription rates: Domestic, two dollars, in advance; Canadian, Foreign three dollars a year; single copies current issue, twenty-five cents each, back issues, fifty cents each. Notice of three weeks is necessary to change subscriber's address. Kindly give both the old and new addresses. Editorial and Advertising offices, 25 Spruce Street, New York, N. Y.

Contents copyrighted, 1934.

Plastic Products

VOLUME X NUMBER 6

No Sales Below Cost

NOTHING appears more fair and innocent than the code provision that no goods shall be sold below cost. No industry is more dangerously harassed by this kind of chiseling than the various members of the plastics group. Nevertheless, if we think this matter through to its eventual result, we must conclude that this welcome relief contains a threat of damage to the future of our plastic products more menacing than price cutting.

This idea of protecting profits is the counterbalance in the NRA to those provisions which by raising wages and shortening hours sacrifice profits to a spread of purchasing power. The codes were a sop to the industrial Cerebus, the promised tempering of the anti-trust laws. Price-fixing is too obvious a device, repugnant to too many voters, so price-fixing is taboo; and profits are to be guaranteed by prohibiting sales below cost.

This is a practical device, provided costs are set-up to include not only labor and materials, but also interest on investment with full depreciation, sales expenses, managerial salaries, and a fund for obsolescence which for a new, fast-developing industry, based on chemical processes, must be very liberal. In other words, "costs" must be inclusive and based upon the operations of the high cost producer. These costs today are inflated by boom-time investments in plant and equipment and held up by depression-time production on a reduced scale. Accordingly, the base of present costs is artificially high.

To build up an impregnable price barrier of this sort is obviously to halt the advance of plastic products. It is a wall directly in the natural path of progress of all modern synthetic materials. Furthermore, it furnishes perfect protection to the high-cost producer, the inefficient manufacturer and the incompetent merchandiser, who bitter experience has taught is too often the unfair competitor. It would finally become a bulwark behind which a host of new firms could nestle comfortably in salvaged plants equipped at present low prices.

Such bars as these are just what the plastics industries do not need. Reduce competition by eliminating the unfit and expand the market by lowering costs—that is the logical program.

Laminated Urea Resins Manufacture and Applications

by H. E. Stockfisch

ITS clear water-white purity recommends urea resin because of the possibility of producing articles and products with color. Extensive developments in recent years have demonstrated the beauty obtainable in molded products of urea resin, both laminated and non-laminated. The resins of the phenolic have made progress in the decorative field but are not entirely suitable for light colors. They are, however, possessed of remarkable strength to toughness, especially the laminated materials.

It is possible to combine, in laminated products, the strength of phenolic resin with the beauty of urea resin, as will be described below.

In this article the descriptions of processes will be limited to those leading to the production of flat plates of laminated paper-base material. The process is divided into descriptions of the resin, impregnating paper with resin varnish, and hot-pressing into plates.

In this country, at present, urea resin varnishes for commercial purposes are more or less controlled by three organizations. The details of manufacture are carefully guarded, and the processes in use in this country have been developed here as well as having been originated in England and Germany. A certain amount of licensing and cross licensing has been the result.

A typical process for making urea resin varnish can be conducted in suitable digestors, either with or without provisions for autoclaving, and connected with a vacuum system for evaporating excess water under reduced pressure. Dissolve 300 lbs. urea in 1200 lbs. commercial formaldehyde solution, with a small amount, say 20 lbs., of phthalic anhydride Heat slowly and uniformly to 90° C., with stirring, under a reflux condenser. Continue to heat at this temperature until the mixture becomes clear and water white. Remove excess water and volatiles by vacuum evaporation so as to obtain a solution containing about 55 per cent. solids.

The syrup thus obtained is removed after cooling and can be stored for periods up to about six months without danger of loss of potency and can be diluted with water to about 30 per cent. solids without separation of solids. The syrup will possess approximately the following properties—

Showing unusual application of laminated walls and ceiling, counter panels and boring.

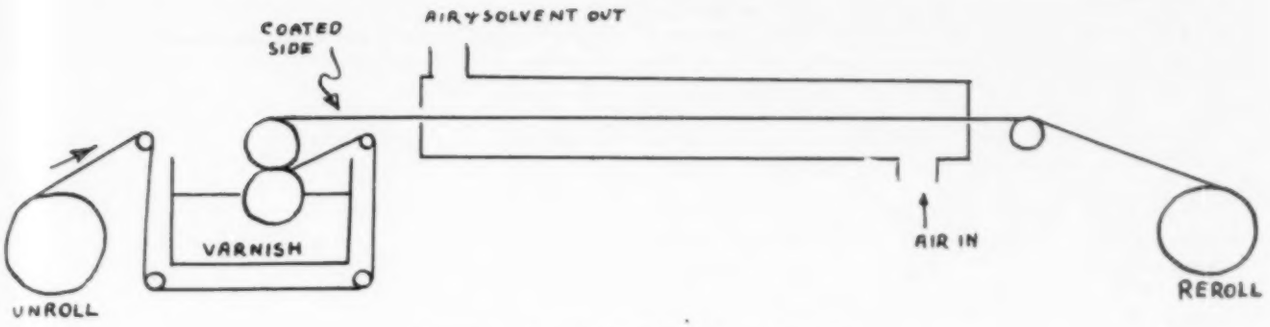


Figure I. Tunnel System, coating one side.

Density 25/4 C.	1.220
Viscosity (absolute)	11 centipoises
Solids	55%
p/H value	7.5

It should be understood that this is only a typical process outline. Variations of methods and materials made be made, as, for example, a certain amount of thiourea may be utilized. The syrup can be shipped around in steel drums. The author prefers to protect expensive impregnating equipment with a light coat of chromium, as, for example, on the rolls and submerged gears.

Impregnation

The purpose of impregnation is to saturate the fibers of a material with a solution of resin so that upon drying the solvent a quantity of solid resin will remain. Subsequent heating in hot presses chemically converts the resin to a permanently infusible state. This type of resin is known as thermo-setting or heat-hardening and is thus distinguished from the types known as thermo-plastic, which can be softened by applying heat, like cellulose acetate.

Absorbency is the chief common characteristic of all materials to be impregnated. All substances, such as sizing, must be avoided, since saturation would be retarded. The paper is made in rolls of widths up to fifty inches. The composition varies with the type of product into which it will enter. Varying mixtures of alpha-pulp, rag stock, and cotton linters comprise the essentials of composition. The paper may be super calendered if designs are to be printed on, or may be only calendered. The latter forms the major quantity of that used. In certain products a paper containing a small amount of pigment, as titanium oxide, will be incorporated at the mill to give opacity to the final plates. The reason for this is that urea resin has the property of imparting translucence to the molded products, a condition which is valuable but not always desirable.

Resins in organic solvent, as phenolic resin in a benzol-alcohol solution, can be used to saturate the paper without any difficulty as far as the paper is concerned. In watery solutions of urea resin this is not possible without modifying the paper A piece of paper wet with water tears and disintegrates. As the character in a poem of the Yukon it "hasn't got the strength of a louse." In other words a fifty foot high festoon of wet paper would be soggy and completely collapse from its own weight. If we consider that the tension rolls on an impregnating machine exert a substantial drag, it can be understood that something must be done to the paper to improve its strength without decreasing absorption power. A toughening process has been worked out to accomplish this very satisfactorily.

The color of the laminated products is produced by placing a colored sheet on the surface, impregnated with the natural undyed resin varnish. Dyes suitable for alcohol-benzol soluble resins are unsuitable for the water solutions of urea resin. Papers dyed with satisfactory dyes are now available.

The author makes the comparisons with phenolic resin because of the widespread use of it. Although paper is referred to, it is possible to use fabric as, for example, white or colored cotton cambrics. Very pretty effects can be obtained with printed fabrics. The colors are reproduced very faithfully in the molded plate, as well as the appearance of the woven construction. Fabric base material is more flexible than paper base. In addition to colors, and white and black materials, certain marble effects of remarkable beauty have been obtained. A Verdi-Antique is especially attractive.

Two types of impregnating machines have been developed for synthetic resin work, namely the Tower and Tunnel types. The illustrations in figs. 1, 2, 3, show the basic principles of operation. A system of steam pipes and baffle louvres heat and control the flow of a counter current of air which dries the saturated material. Since water is the solvent no recovery is required. An efficient system will recover 85-90 per cent. of volatile organic solvent. Both machines are totally enclosed with sheet steel. They are very solid in construction and are equipped with completely synchronized gears, rolls, clutches, and guides, for uniform movement of the paper. The speed of the paper may be varied to suit conditions of the process. Air-flow and temperature control devices furnish additional insurance for quality, as do flow control and varnish levelling appliances. As in any mechanism all the mechanical devices mean little or nothing unless careful intelligent supervision is applied.

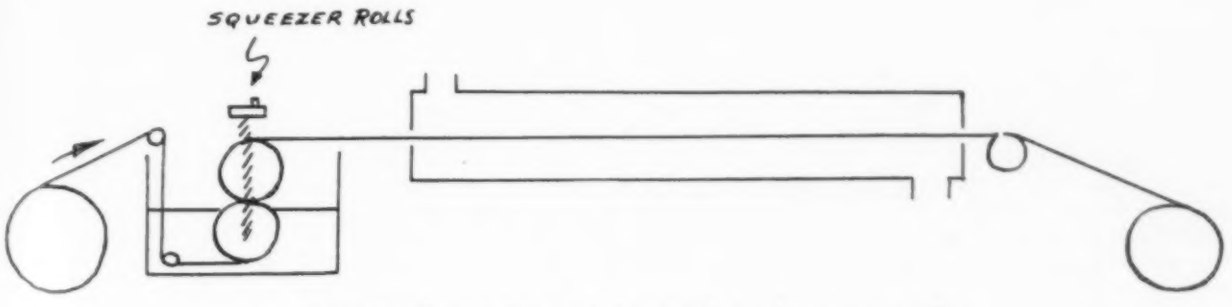
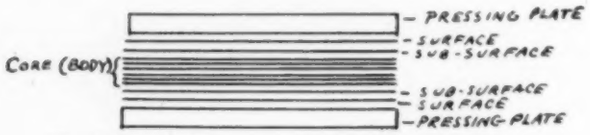


Figure II. Tunnel System, fully saturating using squeezer rolls.

The tunnel machines are about 100 ft. long, the towers about 50 ft. high. The former produces paper for cores of plate at fairly high speed with resin content approximately 50 per cent. The latter runs at slower speeds with a succession of dips to produce surface materials with approximately 65 per cent. resin. Each dip is followed by drying.

If we wish to impregnate a white paper for core purposes it is threaded through a succession of tension rolls and around the dip rolls as shown in Fig. 2 and through the tunnel to the re-roller. Pass through the varnish at a speed of 100 inches per minute with the tunnel temperature at 80° C. The accuracy of resin content is controlled mainly by the action of the squeezer rolls. The effect of these is to force the varnish into the fibres. Resin content is determined at the issuing end from time to time by cutting out a sample of unit area and noting the gain in weight over a sample of similar size without any resin. Certain routine tests must be made to control the fluidity of the resin. This test is made under conditions identical with those in the molding press.

To produce impregnated material for surfaces of plates the colored or other decorative material is threaded through the tower, passing through two dips of varnish of somewhat higher solids content. A speed of 30 inches per minute with the temperature of the tower at 85° C. should be conducted. The issuing material is checked by similar tests. The material must be free of wet areas or drops of thick syrup. The material as it emerges from the tower should be just dry enough to prevent the rolled material from sticking. A certain efficiency can be gained by cutting the material into



Showing how impregnated sheets are built up for decorative plates

proper lengths on a sheeter, as it emerges.

The quality of the impregnation largely determines the successful molding into final products. Strict attention to detail and capable supervision are absolutely necessary. In processing heat-hardening resin it should always be remembered that a chemically active material is being handled.

Cleanliness and dust suppression are of great importance in every department as the smallest specks of dirt on the surface material will show in magnified form in the final product, especially white, yellow, etc., colors. All impregnated stock must be stored in dust-free rooms. Too much heat should be avoided as it may dry out and otherwise lose part of its potency.

Molding

Molding is the conversion of the impregnated papers into products which are permanently hard and decorative. This is accomplished by baking upder pressure. To obtain smooth glossy surfaces on plates or metal sheets, chilled pressing plates are used which also act as separating leaves between the molded plates. Copper or stainless steel are very suitable for pressing plates. The thickness of the former is 1/16", of the latter 1/8". The steel plates are very hard and rigid while the copper is quite soft in comparison. Generally speaking the use of copper is practically obsolete since the development of large plates of polished stainless steel of the Enduro type. The dimensions of the plates correspond to the dimensions of the platens in the hydraulic presses. The minimum is 37 x 37", the maximum 50 x 100". High luster is obtained on both sides which are then protected by a coat of chromium. Bare copper should not be used against resins of the thiourea type as the sulfur in the thiourea will cause a blackening due to the formation of copper sulfide. The

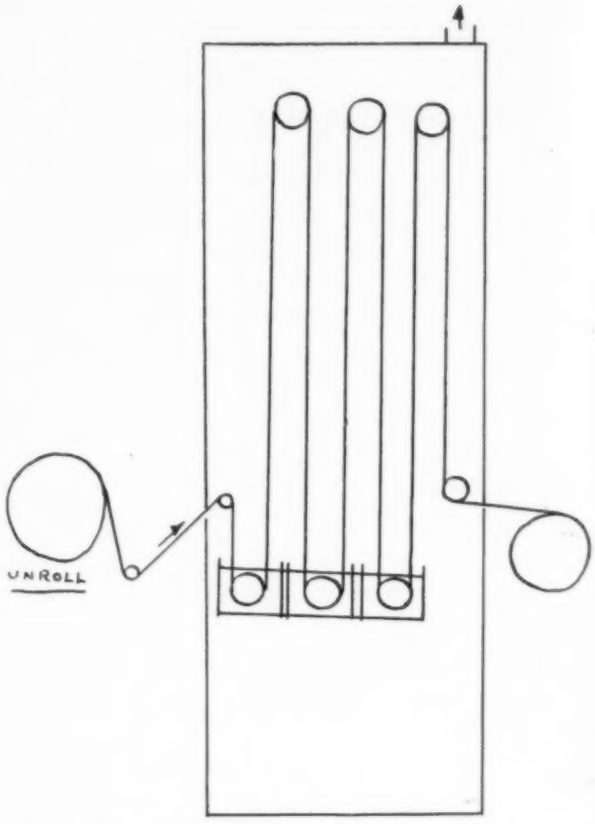


Figure III. Tower System, showing succession of dips

stainless steel will resist the sulfur but the best practice requires the use of chrome plated surfaces. A film of .005" is very satisfactory, and does not peel or crack if put on properly. It is a fact that the finish on a pressing surface is reproduced with the greatest fidelity on the molded surface. It is therefore easy to see that careful handling is absolutely essential as any blemishes would show in magnified form. The two standard finishes on decorative molded plate are high gloss and satin. The satin finish is applied to the molded plate by rubbing with oil and pumice on suitable machines, or it is applied to the steel pressing plates and reproduced by molding. The latter is more practical.

The platen press has six or more rolled steel plates about 3½" thick superimposed above each other and all heated with steam. Loads of material are placed between each platen after which they are closed hydraulically and the material baked. That is the essential of operation of a platen press. Each platen is bored for steam and cooling water, and are separated from each other when the press is open by about 3 to 5" depending on the travel stops on the press. It is into these spaces between platens that the impregnated material placed between pressing plates is loaded. The size of the platens for molded plate varies in different laminating plants where phenolic and other products are molded. A minimum size of 37 x 37" and a maximum of 50 x 100" with several intermediate sizes are the common dimensions. The molded material is the same size when removed from the presses, after which a sawing operation trims to 36 x 36 or 48 x 96, the latter being the same dimensions as standard wall boards. Quite naturally, any sizes smaller than these can be sawed.

The impregnated materials of approved quality are cut in lengths corresponding to the length of the platen from material the same width as the platen. To prepare a press load of materials for a 1/16" thick decorative plate proceed as follows. Place two sheets of say Chinese red surface material on a scale, two sheets of pigmented subsurface paper,

and sufficient core sheets to make a total weight of 5½ lbs., all in size 37 x 43". Three units like this can be weighed, arranged as shown and placed alternately between pressing plates in each opening of the press. The number of plates per opening is determined by the characteristics of the press. It can readily be seen that if a press is provided with sufficient openings it will be unnecessary to overload. Conversely, if only a small number of plates are to be molded openings can be left empty. The objection to placing too many sets in each opening is that the material is overcured next to the platens and under-cured at the center of the load. Carefully written and easily understood process specifications are one way to avoid errors of operation. Sufficient time must be allowed operators to carry out the processes properly. The author has seen many instances where the evils of the standard time system have worked havoc on the quality of products of this as well as other products. The usual net result of doing a chemical job like this in a certain fixed time is to afflict the men with a bad case of the jitters with consequent slurring of workmanship.

After the materials and pressing plates are loaded into the openings of the press sufficient hydraulic pressure should be applied to exert 1500 lbs. per square inch of the surface of the material. On a 37 x 43 size this would amount to 1200 tons.

After the press is closed as above, steam is passed through the platens and brought up to 140-145°C. very quickly and then baked at the same temperature for 40 minutes. Close steam and open water until mass is at room temperature. Release the pressure, allow the press to open and remove loads from each opening. The pressing plates will readily strip off after a little practice. The molded plates will be bright and smooth and quite beautiful. All that remains to be done is to saw off the oversize.

The metal pressing plates are inspected and any specks of resin dust wiped off and are then ready for further pressings. Pressing plates carefully handled will last for several hundred pressings before the finish is affected. They can then be ground and used for commercial electrical and industrial mechanical molded plate. It is important to clean and inspect the platen surfaces, also.

Urea resin plates in large sizes have a slight tendency to shrink, as well as being somewhat high in cost. These conditions can be remedied by substituting the urea resin core with phenolic impregnated paper. A slightly different technique is required for proper baking and bond adhesion. Still a third method may be utilized for thick plates. A solid wall board of masonite or pressed wood type is saturated with phenolic resin by dipping, after which it is oven dried. One side is covered with say a sheet of Chinese red as before, and underlaid with several sheets of sub-surface to act as a pad and to produce the correct shade. The original thickness of the wall board should be determined to produce molded plates of the standard ⅛, ¼, and ⅜" thicknesses which may be applied directly to walls, etc. It will be necessary to counteract any warping tendency by molding a couple of sheets of core paper on the reverse side of the panel.

The 1/16" plate is usually sanded on one side and coated with a modified casein cement and while still moist it is veneered to plywood in a veneering press. The material may be veneered to one or to all surfaces. It can be readily understood how universally this material may be applied as the decorative and protective surfaces on all manner of walls and furniture.

A representative group of outlets includes—

Airplanes	Stateroom covering	Toilet partitions
Hotels	Cabin lining	All partitions
Railroad cars	Dresser and table tops	Kitchen and sink panels
Elevator panels	Car interiors	Specialty manufacturers
Restaurant applications	Hospitals	All building
	Bathroom Lining	Flush type doors
	Desk Covering	Interiors
		Sign material
		Fabricated shapes
		Table tops and bar covering

Molded Camera Cases

Back in the days when Pearl White was being featured in serials and Francis X. Bushman was the movie matinee idol, the first all Bakelite Molded motion picture camera was introduced. Companies were just beginning to send their stars and studio crews "out on location". This meant changes in climatic conditions, and sometimes these extremes in temperature and humidity would have considerable effect on equipment, particularly cameras. Previous to this, motion picture cameras had been made of metal or wood. They were costly instruments, and when the case cracked, or the metal sides expanded or contracted, it meant not only the spoilage of the film, but expensive repair work. The introduction of a molded case created a great deal of interest in the industry at the time, and was the forerunner of molded camera cases of all kinds.

In the last few years, there have been a number of small, molded compact vest-pocket cameras, some of them selling as low as 40 cents a piece, a price that seemed almost beyond the realm of possibility a decade ago. These small cameras have done a great deal in stimulating interest in amateur photography, and frequently have led to the purchase of more expensive equipment. A recent addition, and one that is particularly interesting from the standpoint of design, is the "Ebner," illustrated in our roto section, the case of which is made of Bakelite Molded. It is an excellent example of meticulous die work, some of the interior sections being as thin as .0265". The metal inserts and other working parts have been assembled with the accuracy of a fine watch.

A wide range of surface effects is possible; satin finishes, high glossy surfaces, engraved designs, stippled effects, bright metal inlays, and numerous other combinations can be obtained in plain and mottled colors. This gives the designer plenty of latitude in developing distinctive design.

There is a tendency at the present time, among the manufacturers of various measuring devices, used in industry, to re-design their instruments along modern lines. Some firms are standardizing the design of all their products, so that when a number of instruments are mounted on a control board the entire ensemble will look uniform and pleasing to the eye. It is in cases of this type that a molded material offers the manufacturer many advantages, not only from the standpoint of durability and appearance, but economy of production as well.

Plastics in Sheets

Sheets of cellulose ethers or esters are obtained from a highly concentrated solution of cellulose compounds by heating and forcing them under pressure through appropriate openings, cooling the sheet, and drawing it as it leaves the opening. The temperature of the mass to be drawn must be at least 45° C. and that of the coagulating medium can be between O and 40° C.; this coagulant may be either a gas like air, or a liquid like methyl or ethyl alcohol, glycerin, sugars, chlorides, sulfates, sulfuric or phosphoric acids. As an example, mix pyroxylin, camphor, ethyl alcohol and the monomethyl ether of ethylene glycol, filter, heat and extrude into an aqueous solution of glycerine. The extruded sheet is immediately drawn, then passed through a second bath and finally treated with a current of hot air for several days. The sheets can be used in safety glass or for the manufacture of phonograph discs.—Brit. Pat. 393,957.

Life of Drills on Plastics Increased Five Times

by C. E. Greenawalt

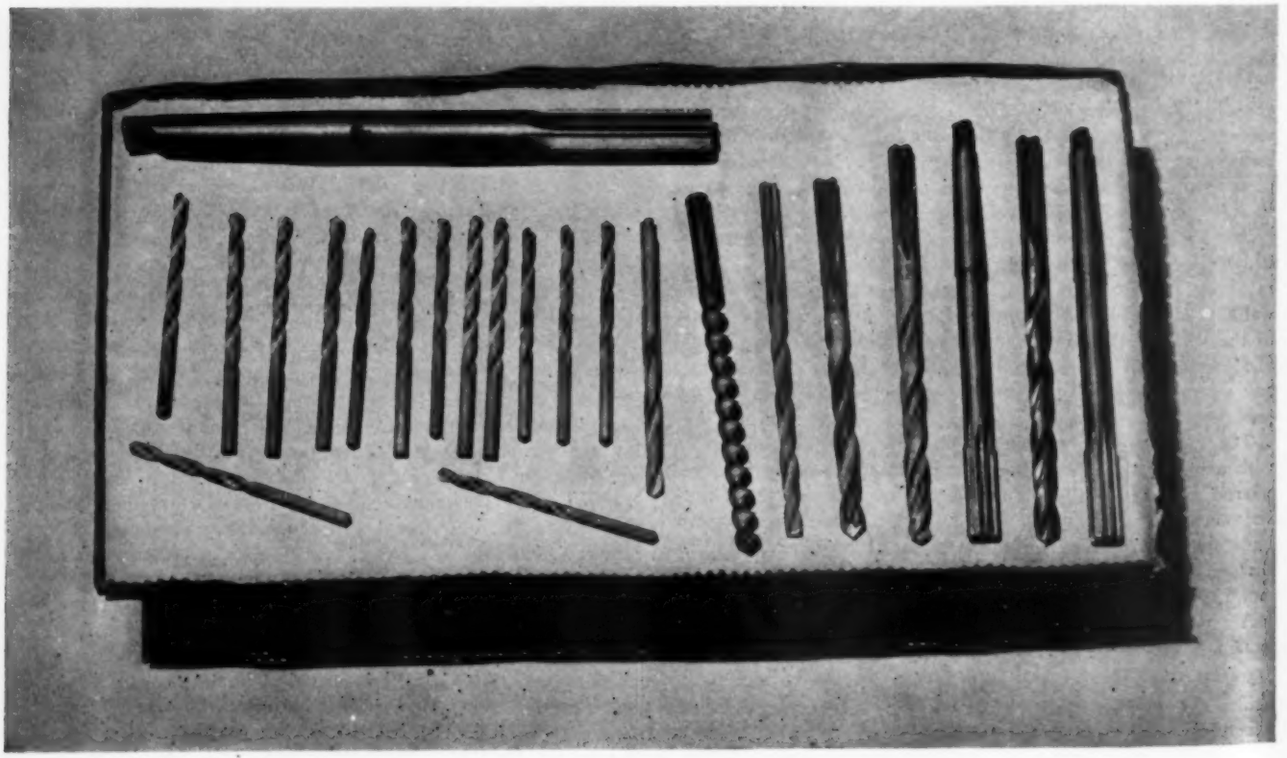
Westinghouse Electric & Manufacturing Co.

Drilling Micarta gear blanks with nitrided tools.

IN his everlasting search for new processes in the manufacture of plastic materials, especially those requiring high electrical resistance, the engineer oftentimes regards the drilling and tapping of the material as of minor importance. This would be a natural assumption in those cases where the material contained a low percentage of silicate. However, rapidly soaring cutting tool costs soon indicate that the abrasive content is too high and a change in material is advisable.

New and potential discoveries in the field of nitriding have served to eliminate many problems relative to the machineability of resinous materials. Extraordinary results are obtained when this process is applied to regular high speed cutting tools.

Heretofore, the drill press operator gave up trying to meet his limits due to decreased cutting speeds and the engineer began to shop for a better drill than the regular high speed variety and ended up by finding that none were available, with the exception of tungsten carbide drills that answered the purpose on some occasions, but were usually not economical for small lot jobs, or they were not carried in the small sizes.



A tray of nitriding drills and reamers.

The search has now been narrowed down to finding a manufacturer with suitable nitriding equipment to whom the high speed drills, taps, etc., can be sent for nitriding, and not to finding a non-existing superior tool.

It is a universally accepted fact that the ordinary high speed drill represents the ultimate in efficiency and is used by all manufacturers for a miscellaneous line of drilling; with the plastic industry consuming a large share of small sizes of drills and taps.

Various secondary heat treatments have been accorded the high speed drills in the past, along with a multitude of flute designs and grinds, in an attempt to produce a better tool for the workman. The basic hardness of the tool remains the same, however, in most instances being around 750 Vickers-Brinell. While carbon steel drills can be hardened considerably higher than this figure, they are nearly worthless for high speed drilling of moulded materials.

With the advent of nitriding into the commercial field during recent years came many noteworthy and profitable experiments with this process of applying a very hard case to materials manufactured solely for that purpose.

There is no need to exploit further the well known merits of nitriding, other than to mention its non-deforming qualities, the extreme hardness of the case or the longevity of mechanical parts, dies, moulds, etc., subjected to this process.

It is not generally known, however, that the regular high speed tool can, with very little additional cost and no distortion, be increased in hardness as high as 32 per cent. or about 1100 Vickers-Brinell by the simple expedient of nitriding, the depth case ranging from .006 inch for small sizes of drills to .014 inch for the larger sizes.

Realizing the importance of obtaining a super-hard drill or top for use on moulded materials, the Westinghouse Electric and Manufacturing Company began a series of exhaustive tests several years ago to determine whether or not the process of nitriding could be successfully applied to cutting tools, principally those of a rotating form such as drills, taps, reamers, and milling cutters. No tests were made during this period on boring or turning tools as the

Test Cube #	Type of steel	C	Mn	P	S	Si	Ni	Cr	Va	W	Co	Mo	Alum.	Misc.
1	C R S	.08	.60	.090	.100									
		.16	.90	.130	.180									
2	High Speed	.60	.15	Max.	Max.	Max.		3.00	.75	17.00				
		.75	.40	.04	.04	.04		4.50	1.50	19.00				
3	Nitriding	.25	.40	Max.	Max.	Max.						.60	1.00	
		.35	.70	.04	.04	.30						1.00	1.50	
4	High Speed	Same as Block # 2												
5	Cobalt	.65	.25			.20		4.00	.90	17.00	4.50	.40		
		.70	.35	.03	.03	.40		4.25	1.10	18.00	5.00	.50		
6	"	"	"	"	"	"		"	"	"	"	"		
7	"	"	"	"	"	"		"	"	"	"	"		
8	"	"	"	"	"	"		"	"	"	"	"		
9	Nitriding	.75	.20			.41	.12	4.28	1.05			9.61		
10	"	"	"			"	"	"	"			"		
11	"	.75						4.50	2.00	18.50		.50		
12	"	"						"	"	"		"		
13	"	Same as Block # 3												
14	High Speed	Same as Block # 4												
15	Cobalt	Same as Block # 8												
16	"	"	"	"	"									
17	Nitriding	1.00	.20			.30		11.00	.15			.75		
		1.15	.35			.60		13.00	.25			1.00		
18	"	1.00	.20			.30		11.00	.15			.75		
		1.15	.35			.60		13.00	.25			1.00		
19	"	1.00	.10			.20		1.10				1.10		
		1.10	.30			.40		1.30				1.50		
20	"	"	"			"		"				"		

HEAT TREATMENT

Numbers 1,2,3,5,7,9,11,17&19, were not heat treated.

# 4 & 14	Preheat	600°-1750°F.	Quench	2400°F.	Draw	1000°-1100°F.	for	1	hour
# 6,8&15	"	600°-1400°"	"	2350°"	"	1000°-1100°"	"	2	"
#10	"	1550°"	"	2250°"	"	1000°"	"	1	"
#12	"	1550°-1600°"	"	2350°"	"	1100°"	"	2	"
#13	"	" "	"	1600°"	"	1100°"	"	1	"
#16	"	600°-1400°"	"	2350°"	"	1000°-1100°"	"	2	"
#18	"	2000°"	"	2000°"	"	1000°"	"	1	"
#20	"	1550°"	"	1550°"	"	1000°"	"	1	"

Chart Number I. Chemical analysis and heat treatment of special alloy, nitriding steels.

tungsten carbide tools in this class were considered adequate for these operations.

The research work has since been completed and the results obtained were both surprising and later profitable when applied to production.

Comparison tests were first conducted between regular high speed tools not nitrided and those constructed from special nitriding steels and nitrided.

Regular production jobs on micarta and bronze were selected in the shop and at the conclusion of the run it was found that the regular high speed tools lasted from two to three times longer than the nitrided tools, the latter chipping badly due to the extremely hard case and the lack of a proper toughening constituent in the composition of the steel.

Up to this period no attempt had been made to nitride the regular high speed tools as considerable doubt existed at the time by those interested in nitriding as to the practicability of nitriding high speed steel due to the absence of aluminum in its composition and in a great many brands the absence of molybdenum; both representing vital properties necessary in securing a satisfactory case depth. For this reason it is apparent that one would easily overlook the paramount factor in the entire endeavor.

Fortunately at this time trouble was experienced in one of the shop sections in drilling a Moldarta base with the diameter of the hole having a very close tolerance. In addition to the cutting edges wearing more than usual the diameter of the drills also wore rapidly undersize necessitating new drills from the tool room at a prohibitive rate.

Various special drills were introduced with slightly better results. Included in the lot were tungsten carbide drills and the diameter of these also was reduced by abrasion back of the hard tip with the resultant failure of the tip.

As a last resort it was decided to include a number of high speed drills, of the sizes required in the next regular nitriding heat along with the usual line of dies, moulds,

Test Cube #	Growth of Blocks	Prev. to H. Treat.	After Heat Treat.	After Ni-tride	-.002	-.004	-.006	-.008	-.010	-.012	-.014	-.016	-.018	-.020
1	.001 to .002	146		243	223	213/	213	213	213	213	213	213	213	213
2	.0015	207		1073	748	592	454	340	278	249	243	238/	238	238
3	.001 to .002	198		1030	940	732	557	420	328	261	221	193/	193	193
4	.0015 - .002	207	705	775	1088	1003	884	802	757/	757	757	757	757	757
5	.001	298		610	470	374	306	300	296	294	292/	292	292	292
6	.00065 .0008	298	841	1073	1058	884	831/	831	831	831	831	831	831	831
7	.0013 .0015	294		677	692	622	398	320	284	278/	278	278	278	278
8	.0008 .0011	294	873	1175	1152	1003	918	831/	831	831	831	831	831	831
9	.0011	221		732	628	483	320	272	227	224	219	215	210/	210
10	.0014	221	873	1200	1186	1119	952	802/	802	802	802	802	802	802
11	.0006 .0008	256		766	748	684	526	359	284	258/	258	258	258	258
12	.0006 .0008	256	821	1103	1088	964	862	793	784	775/	775	775	775	775
13	.0012 .0015	210	259	1030	940	784	574	430	333	272	251/	251	251	251
14	.0012 .0014	269	873	1058	1073	1003	884	802	775	766/	766	766	766	766
15	.0010 .0015	294	873	1175	Hardness after drawing 1/2 hour at 650 C - 1030									
16	.0009 .0010	294	873	1175	"		"	"	"	"	"	" "	- 1058	
17	.0009 .0011	197		426	335	241	204	201	196	193/	193	193	193	193
18	.0047 .0048	197	642	775	766	656	574	536	528	516/	516	516	516	516
19	.0007	237		438	420	395	371	335	306	286	267	263	254/	254
20	.0008	237	496	616	635	628	598	557	552	521	506	491	483/	483
		/ after hardness			reading, designates the end, or depth of case.									

Chart Number II. Co-relative Vickers hardness, to depth of case; and growth of special nitrided test blocks 1 X 1 X 1"

pins, ratchets, etc. At the end of a twenty-five-hour heat the drills were removed from the box, polished and a check made on the number of holes drilled.

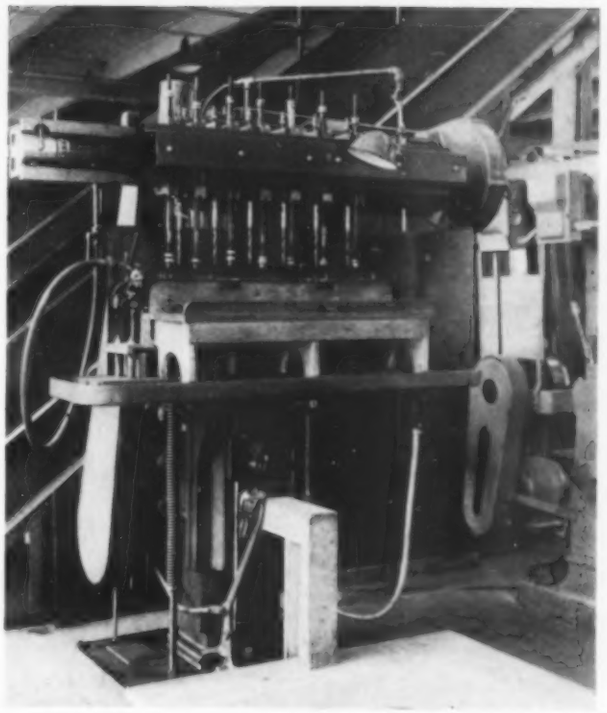
In place of the expected rapid wearing, chipping, or breaking of the drills it was found that not only one but a dozen drills held up from six to eight times longer than before nitriding. This same ratio was maintained after resharpening the drills, proving that re-nitriding was unnecessary after each grind.

The high speed tools that were used in the first test not nitrided were now nitrided and lasted from two to three times longer than the tools made from regular nitriding steel or from four to six times longer than their own previous record.

Other interesting sidelights of the investigation included: Non-deformation of the tools, an important phase, inasmuch as finished tools as received from the manufacturer can be immediately nitrided and placed in service without additional cost, other than that of nitriding.

The non-carbonization or the elimination of an outside scale as in case-hardening is another important factor contributing to the successful operation of the tools.

Establishing a super-hard case on the tool from .006 inch to .015 inch deep per side depending on the number of hours nitrided. The depth case as mentioned does not mean that the tool increases this much over the original size, but is formed from the outside of the initial size, inwardly leaving a soft core in the center; thus insuring



Drill No.	Type of Drill	Total Inches	Condition of Drill	Drill No.	Type of Drill	Total Inches	Condition of Drill
	1/4"Drill in BRASS.				3/8"Drill in BOILER PLATE.		
4	HS Not nitrided	345	Worn	4	HS Not nitrided	100	Worn
4	"Nit.25 hours	39	Worn	4	HS nitrided	9	Worn & Chipped
6	Cobalt nitrided	258	Worn	6	Cobalt nitrided	8	Chipped
8	Cobalt nitrided	687	Worn	8	Cobalt nitrided	4	Chipped
*	Nit. by Manuf'r	592.5	Chip.badly	*	Nit. by Manuf'r	6	Chipped
4	Nit.&drawn 650°C	331.5	Worn	4	Nit.&drawn 650°C	6	Chipped
6	" " "	438	Worn	6	" " " "	2	Chipped
8	" " "	502	Worn	8	" " " "	4	Chipped
	1/4" Drill in COPPER.				3/8"Drill in EBONY ASBESTOS.		
4	HS Not nitrided	115	Worn	4	HS Not nitrided	70	Worn
4	HS nitrided	4	" &broken	4	HS nitrided	100	Worn
6	Cobalt nitrided	41	Worn	6	Cobalt nitrided	150	Worn
8	Cobalt nitrided	18	Chipped	8	Cobalt nitrided	75	Worn
*	Nit. by Manuf'r	58	Worn	*	Nit. by Manuf'r	50	Worn
4	" &drawn 650°C	43	" &broken	4	Nit.&drawn 650°C	100	Worn
6	" " " "	33	Chipped	6	" " " "	100	Worn
8	" " " "	40	Chipped	8	" " " "	200	Worn
	3/8" Drill in CAST IRON.				1/4" Drill in MOLDARTA.		
4	HS Not nitrided	600	Worn	4	HS Not nitrided	150	Dia. Worn
4	HS nitrided	21	Chipped	4	HS nitrided	1800	Dia. Worn
6	Cobalt nitrided	314	Worn&Chip.	*	Nit. by Manuf'r	2100	Dia. Worn
8	Cobalt nitrided	10	Chipped	*	Special Nit.Mfr	2300	Dia. Worn
*	Nit. by Manuf'r	90	Chipped	*	Spec.3 Lip Nit.	4076	Dia. Worn
4	Nit.&drawn 650°C	27	Chipped				
6	" " " "	23	Chipped		3/8"Drill in SLATE.		
8	" " " "	2	Chipped	4	HS Not nitrided	26	Worn
	Total inches on chart represents am't drilled per one grind.			4	HS nitrided	12	Worn&Broken.
				4	Nit.&drawn 650°C	1	Worn

Chart Number III. Comparative nitrided drill tests. Note—drill members chemical analysis and heat treatment of drills, same as corresponding test cube numbers on Chart I. Above, multiplespindle drill where nitrided drills are especially economical for Micarta strips.

against breakage. The advantage of a tool having this important feature is self-evident.

However, there does occur in the diameter or thickness of the tool after nitriding a slight expansion varying from .0005 to .0015 overall depending not on the size of the tool but on the number of hours nitrided. This in turn represents another major discovery in the nitriding of tools as shown in the case of the drills for the Moldarta job previously described.

The drills in question were worn undersize approximately .0015 inch and rendered useless for the work. But when nitrided the drills were brought up to the proper size and again placed into service.

One set of drills was nitrided and after wearing each time was re-nitrided twice in succession with satisfactory results. The growth apparently ended with the third re-nitriding as no increase was noted in the size of the drills. This reclamation of worn tools on moulded materials can be made to pay a generous dividend.

After many substantial economies had been effected in the Micarta Division it was deemed advisable to conduct further comparative tests on other non-ferrous and ferrous materials such as slate, ebony asbestos, cast iron, steel, brass, etc. The drills selected to run opposite the high speed drills not nitrided included both nitrided high speed and cobalt drills and special drills nitrided by the drill manufacturers.

The drills were all tested under similar conditions and the results summarized in Chart No. 3 of this article under the caption "Comparative Nitrided Drill Tests."

The results of the test as shown on the chart prove that for the present nitrided tools can be used successfully only on materials of the resinous type, with some exceptions, as found by the writer in reaming brass and bronze alloys with some success.

In addition to the drill test, a series of individual tests with taps and cutters was conducted on the same materials with practically the same results. This eventually proved profitable in production jobs requiring the use of small taps of the 6-32, 10-32 variety on moulded materials, the taps lasting from four to five times longer.

At the same time supplementary tests were undertaken to learn more of the characteristics of a number of leading nitriding steels on the market. Included in the list were high speed and cobalt steels.

Samples were solicited from various manufacturers and twenty test cubes were constructed one-inch square. Several cubes were made from the same steel in some cases but were subjected to different forms of heat treatment before nitriding. The blocks were numbered from 1 to 20 respectively before nitriding to avoid any errors in later tests.

This data, including the composition and heat treatment of the blocks, is contained in Chart No. 1.

After shaping and heat treating, the blocks were ground to 1.000 X 1.000 X 1.000 and then nitrided for a period of twenty-five hours; then buffed slightly on a soft rag wheel to remove any surface dirt. The size was again checked for growth after which a series of steps .002 depth X .0625 wide were ground on one side of each block to note the co-relative hardness to the depth of case. The depth case was established at the point where the Vickers reading remained constant, thus denoting the soft core.

From the experience gained during these observations and tests we have found that high speed cutting tools such as drills, taps, reamers, and milling cutters if nitrided are far superior to the same tools not nitrided for cutting resinous materials only, such as micarta, ebony asbestos, etc., with some exceptions in brass and bronze alloys.

The Bakelite exhibit at the National Premium Exposition held in Chicago last month visualized to hundreds of visitors stimulating ideas for sales promotion. The attractive display of all sorts of home, personal, and novelty accessories, all fabricated from Bakelite materials, went strong with the visitors who devoted much time to this booth.

Odorless Resin Products

A resume of efforts toward the elimination of this problem

By G. E. Landt

Chief Chemist, Continental-Diamond Fibre Co.

IT was early recognized that certain use limitations were placed on phenolic resinoid plastics because of the odors which characterized them.

The materials entering into their composition are strongly odorous. Phenols and cresols, formaldehyde and ammonia are inherently malodorous, and offer a bad starting point for the manufacture of inodorous resins, since their odors may persist in the the finished product. In cases where hexamethylenetetramine or large quantities of ammonia are used, the fishy odor of amine derivatives may also be encountered.

Early improvements in manufacturing methods produced materials essentially free from ammonia, amine or formaldehyde odors. The persistent odor of phenolic bodies and the sensitivity of the olfactory nerves to such bodies made it extremely difficult to eliminate phenolic odors from these plastics, especially as the phenolic odors seem to be definitely traceable to the resinous bodies which were formed in the reaction. The question as to whether the phenolic odor results from locking the phenolic material in the resin at the time it is hardened, or whether the odor is a characteristic of resinous bodies themselves lies behind that practical question of producing relatively inodorous materials.

Odorous Characteristics of Phenols and Xylenols

One of the first approaches to the problem gave consideration to the odorous characteristics of phenol and its homologues, the cresols and the xylenols, the prime phenolic bodies seeming to differ in the quality and intensity of their odor; some of the xylenols having the least objectionable and least penetrating odor as compared with meta cresol and phenol.

The presence of impurities in the phenolic raw material also has considerable bearing on the problem. When one remembers that such substances as pyridine and organic sulfur and derivatives are found as impurities, and if one bears in mind the highly objectionable and persistent odor of such bodies, it is obvious that this had to be considered in the general problem of making inodorous materials.

Efforts to produce inodorous resin products may be grouped as follows: Attempts to purify phenolic bodies of odorous impurities by distillation methods[1]; for example—phenols are distilled with alcohol and water, the lower boiling distillations carrying the odorous impurities along with them. The same end was also attained by improvements in the technique of distilling cresols and phenols, which the producers of these materials developed.

The second line of attack was the attempt to purify the resins themselves, particularly as exemplified in the patents of "Seebach[2]". He dispersed or dissolved his resins in salt solutions in high boiling solvents, in solutions of aniline hydrochloride, or in bases and distilled impurities, including unreacted phenolic materials from them. The practice of washing the resins with water or salt solutions was also practiced to remove odorous substances. (Seebach.)

A third line of attack was to control the odorous characteristics through controlling the character of the phenolic bodies that enter into the reaction. Romieux[3] and Landt[4] have approached the problem from this point of view. The selection of suitable catalysts has naturally a bearing on the reaction that takes place and on the odorous character of such resins.

Still another method of attack, covered in pending applications, has been to induce secondary reactions to take place after the resin has been formed in order to change the odorous character of the resins.

Estimate of Kind and Quantity of Odor

Needless to say, the foregoing does not bring the historic developments of this field up to date, as the question involved has so much competitive significance that new techniques continue to be developed in order to improve the inodorous qualities of these materials.

Need for research along these lines called for a scientific approach to the question of odor. Research cannot be guided by opinions regarding the quality and quantity of odor which characterize an experimental attempt at improvement. The problem, therefore, becomes complicated as the phenomena of odor and the detection of odor have yielded little to scientific research.

There has been developed no logically scientific ground from which the subject can be approached; and the field is overrun with perplexities. For example—very pure materials have been stated by some individuals to be inodorous; specifically such a substance as benzol when purified far beyond ordinary limits of purity has no odor. The active odorous principle of Musk (a highly odorous perfume) when isolated and purified becomes odorless. Again, odors become more pronounced when the olfactory senses are activated by other substances which are themselves, inodorous. Moisture is a prime activator. These considerations make a direct approach to the question very difficult.

Nevertheless, in a research or production program designed toward the end of producing a relatively inodorous material, some estimate of the quantity and kind of odor must be made.

Attempts have been made in the past to measure and evaluate odors. This subject was recently reviewed in a very admirable paper by Gordon M. Fair, The Determination of Odors and Tastes in Water.[5]

Without stopping to go into all the research involved in this question, it may be pointed out that odor measurement has availed itself of one of two systems. In the one, odors are

classified in groups graduated through a series starting with group one, containing no odor, to a group five, containing a very strong odor. The method of test then consists in simply evaluating the odor and giving that evaluation its significant group designation.

The second method involves the determination of the "threshold" odor; the "threshold" odor being that odor which is just perceptible to the olfactory nerves. A sample of material under examination is regularly diluted with inodorous air until the threshold odor is attained. The amount of dilution then becomes a measure of the intensity of the odor.

In appraising the odor of phenolic resinoid bodies, recourse has usually been made to a practical test. Such tests are run on the completed laminated or molded article. A sample of this is placed in a container with butter, the sample and the butter being either in contact or in juxtaposition. If the butter acquires a taste then, of course, the resinoid material does not meet the requirements of the test.

Other methods involved isolating a sample of the laminated or molded material for a period of time, sometimes at elevated temperatures, in a closed container and determining at the expiration of this time, the amount of odor present, by the simple expedient of sniffing the enclosed air. These methods are not tools of measurement for guiding research, nor for evaluating the differences between similar materials.

As a consequence, attempts were made to evaluate odors on a quantitative basis. Some attempts were predicated on the assumption that the odor resulted from the presence of free phenolic bodies. The quantitative determination of the free phenol in the resin by the Koppeschaar method, or by the colorimetric determination on the phosphate, molybdate method, would *a priori* give a measure of the odor present.

Another attempt at measuring the odorous character of the material was based on the principle of absorbing the odor with charcoal. A weighed quantity, for instance, ten grams of drillings of laminated or molded material, is extracted with 125 cc. of distilled water for one hour in a Kjeldahl flask placed in a boiling water bath. The flask is then cooled for one-half hour and the contents filtered through glass wool. The contents are divided into 25 cc. portions and graduated amounts of absorbent charcoal (.1—.2—.3 and .4 grams) are shaken with these portions. These are filtered. The object then is to determine which concentration of charcoal is just adequate to remove the odor from the water. This method resolved itself into a modified "threshold" odor determination. Thus in spite of its pretensions to being an impersonal method of odor measurement, this method again reduced itself to a question of the sensory judgment of odor.

In order to check and recheck this judgment, the following procedure was adopted. The portions were tasted as well as smelled, as the sense of taste was found to be more delicate in ascertaining the presence of objectionable odor than the sense of smell. The samples were then treated with three drops of a dilute solution of chlorine water and their evaluation through smelling and tasting was again performed. Since the odor and taste of phenolic bodies is intensified from 300 to 1,000 times by treatment with chlorine, it was assumed that a procedure outlined could check and recheck the sensory appraisal of the materials so that the final results would be as free as possible from variations in judgment.

In the last analysis, all of the methods outlined above reduce to a sensory appraisal of the material. Such an appraisal is a complex result of physiological, psychological and chemical factors and, therefore, is not susceptible to the precision required of a quantitative method of measurement. In the last analysis, odor is not inherent in the material. It is a sensation which the individual experiences. If this statement seems far-fetched, let the reader breathe in deeply over a piece of laminated sheet stock, and then let him sniff it gently. Or, again, let him smell the same sample five or ten times successively. There will be no consistency in his judgment of the odor present. His reaction to the same sample will vary, exceedingly.

The final and crowning dilemma involved in this problem before the phenolic resinoid industry, hinges about the question of whether or not any material is, in fact, inodorous. As a physiological and psychological factor, the absence of odor, or the presence of inodor as we may term it, may be considered to be the result of continued exposure to an olfactory excitant; such exposure rendering one insensible to the odor. If this view is correct, then there can be no truly inodorous material. We merely become insensible to the odors that surround us. It follows, that when we are subjected to any new material, we can, for the time being, detect its characteristic odor. This point should be borne in mind, as the industry seems at times to be groping for a material which is more inodorous than practical consideration permits.

---

[1]"Molinari" U. S. P. 1,909,546.
[2]"F. Seebach" U. S. P. 1,891,455; 1,868,079; 1,697,885; 1,683,702; 1,681,369.
[3]U. S. P. 1,669,674.
[4]U. S. P. 1,679,312.
[5](Jour. New England Water Works Ass'n V, XLVII, Sept. 1933.)

Coating Plastics with Metal

An entirely homogeneous, adherent metal coating can be obtained by dipping the object to be coated in a mixture which contains both a solvent and a reducing agent. Process differs from other methods where the solvent and reducing actions succeed each other, in the latter case, rinsing with water is generally necessary after the solvent action and this may adversely affect the colloidal object being treated. The reducing agent used is soluble in the solvent and does not affect the swelling power of the latter on the surface of the object to be covered with metal. When the solvent acts upon the plastic, the reducing agent is adsorbed on the surface and in the upper layers.

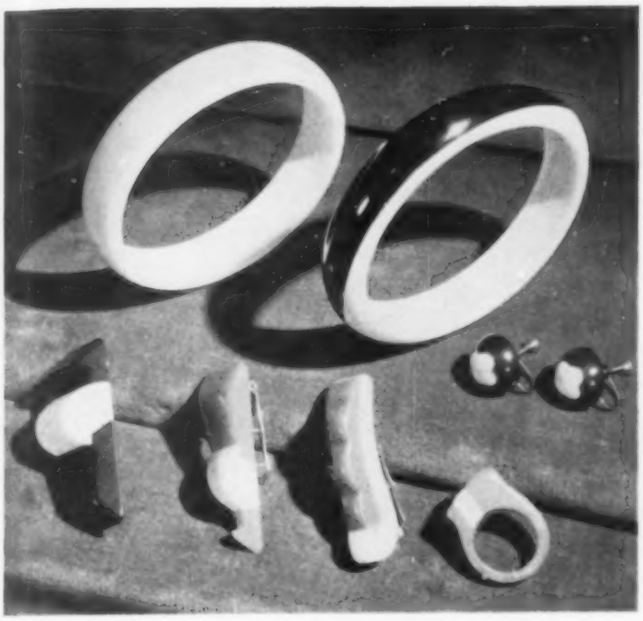
The object may then be dried at temperature low enough to avoid deformation, and immersed in a bath of a reduceable metallic salt and a strongly adhering metallic layer is deposited. Because the reducing agent is finely, deeply and uniformly distributed, the metallic deposit is frequently so dense and strong that galvanic after-treatment may be omitted. The metallized object will acquire a high luster polished by hand.

In a simple manner, the coating may be restricted to certain portions of the object; the parts which are not to be coated are covered with a suitable lacquer, such as nitrocellulose or asphalt. The metal is precipitated upon the lacquer and is removed along with it after mechanical drying. The metallic layer remaining is sharply delineated. Consumption of metallic salt is unusually low as fine and uniform adhesion of the reducing agent leads to fine and uniform deposition of metal. Single dipping can give a metal coating 0.001 mm. thick; galvanic treatment may follow or the object may be re-dipped.

In general, the solution should contain 2-4% of the metallic salt (2.0% gold chloride solution or 2.5-3% silver solution). A 2.5% silver solution (500 cc.) will metallize 1200 sq. cm. of surface. As the metallic solution to some extent passes into the surface of the object, the resulting coating adheres very firmly. On the other hand, the reducing agent must not be permitted to penetrate too deeply, since it will then act only slowly and the metal layer will not be very adherent. With the correct procedure, coating is so firmly anchored that it can be mechanically removed only by destruction of the underlying surface.

The process is suitable for all products made from glue or gelatine, and for various casein, albumin, urea, thiourea and formaldehyde condensation products.—*Kunstoffe.*

Plastics in Pictures

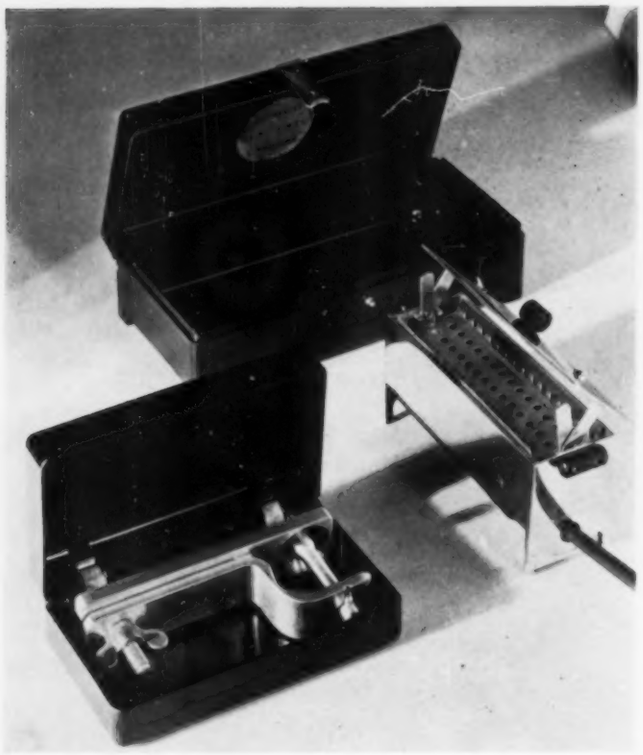


Begging a costume to complete the picture. This attractive jewelry is tempting enough to make milady choose her jewelry ensemble first, afterwards casting about for a dress to match it. Blefeld and Goodfriend offer their new line of two-tone cast jewelry, of Bakelite cast resinoid, in a wide variety of brilliant colors which are permanent and integral with the material.

A moisture-proof shaker guaranteed to keep salt dry under all weather conditions. Sta - Dry Closures shown are of brilliant red and black moulded material.

Akron Photos

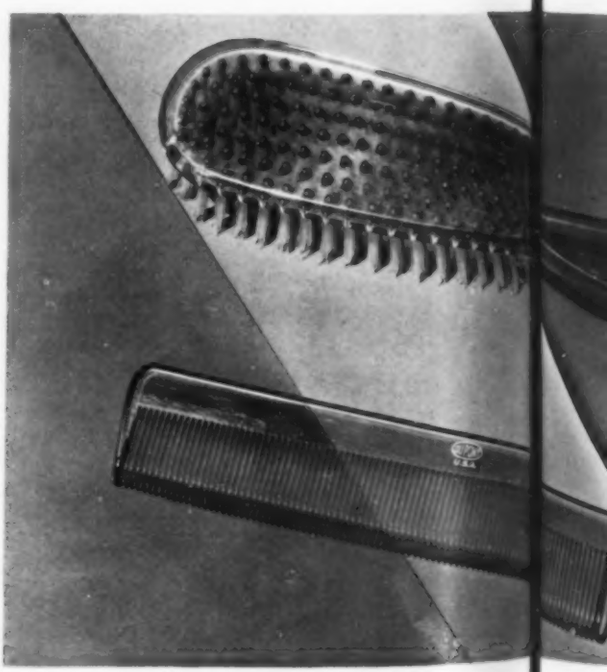
A neat and compact plastic stand with cleverly molded compartments for bottles and orange sticks is a double aid to the manicurist, for it not only keeps her accessories within easy reach but also keeps the space clear on her table. The Evenglo Ensemble, of Bakelite, is the answer to the professional and home manicurist's prayer for such service. The base and plastic closures on bottles and nail white were molded by Kuhn and Jacob



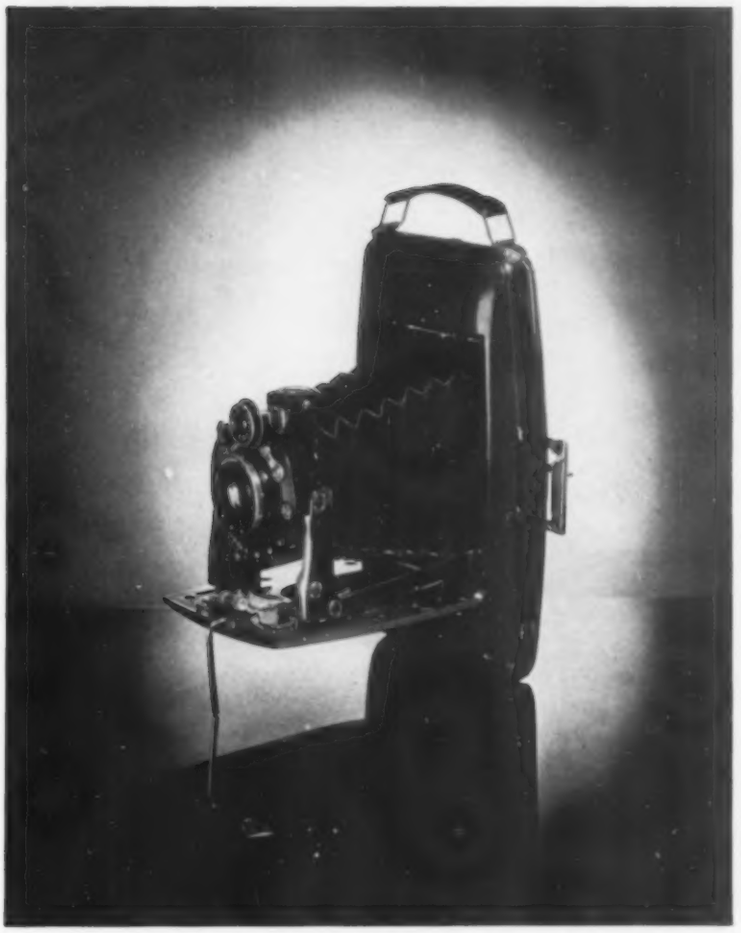
A pocket-size sterilizer and a scientific instrument come packed in molded Durez boxes easily slipped into the doctor's bag, the molded box being proof against moisture, scratching, chipping, etc., throughout the life of the instruments. An added feature of these boxes is that they can be cleaned and disinfected in the usual way without danger of deterioration.

Because chemistry comprises the largest industry of New Jersey and because of the hundreds of new chemically created products, the Newark Museum, at Newark, N. J., is conducting an exhibit under the title "Miracles of Chemistry: New Discoveries for Industry and the Home," to which large crowds have been attracted. One of the features is a demonstration laboratory, fully equipped, for performance of simple and striking experiments. The Plastics Section adds a colorful background to the exhibit, with a striking display of synthetically produced products, made possible through the ingenuity of the chemist in his search for new, better, and cheaper ways of providing the necessities of life.

Unusual technique in the development of plastic products is being uncovered abroad and radical departures in design are reaching the market. The group of articles in this collection are molded of Pollopas Molding Powder.



Below, this new two-piece toiletware set has been especially designed for bathroom or travelling equipment or similar use where handy size and simplicity are required. Developed in transparent Pyralin, product of du Pont Viscoloid, and made in green, rose and amber. The extreme clearness of the colors and the transparency of the material are accentuated by the simple design and lack of trim. The comb is hand made.



"Ebner," vest pocket camera in a molded case described on page 213 of this issue, serves to demonstrate the possibility of making attractive cases for all kinds of instruments.

Fashions in fingernails! The fastidious young lady by patronizing a shop which features the Cutex "Color Selector" may select the exact proper shade of polish for her dainty fingertips. By means of a rotating disc which indicates the available shades the customer chooses her own shade before purchasing. Net result: More satisfied customers for Cutex products. The "Selector" has a pleasing black Bakelite Molded base, upon which is mounted the colorful design.

PLAN FOR PROFITS!

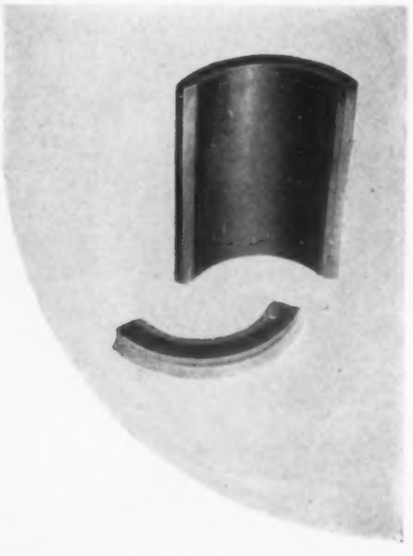
REDESIGN YOUR PRODUCT WITH TEXTOLITE

FROM cameras and cigarette containers to bearings or distributor heads — whatever you make — the probabilities are that Textolite can improve your product.

Textolite is the name of a family of products with a wide variety of form, in all of which synthetic resin binders are used. These products differ widely, however, in other properties. They range from wood-flour-filled hot-molded products, which may be formed into intricate shapes, to heavy-duty laminated material, available only in slabs or cylinders.

Check the twelve outstanding advantages of Textolite given below. There's a grade with a combination of these advantages to fit the particular needs of your product. Redesign now. Plan for greater profits by using Textolite.

GENERAL ELECTRIC



SEND FOR USEFUL BOOKLET

Advantages of Textolite

1. High ratio of strength to weight
2. Resilience
3. Resistance to corrosion
4. Electrical insulation
5. Variety of form
6. Lightness
7. Does not score; does not adhere to metals
8. Uniformity of structure
9. Easily fabricated
10. Permanency of properties
11. Low heat conductivity
12. Decorative

Plastics Dept., General Electric,
West Lynn, Mass.

Please send me a free copy of your new PLASTIC PRODUCTS PRICE LIST, GEA-937C.

Name .....

Company .....

.....

Address .....

.....

943-12

S = Solvent; SS = Solvent Softener; NSS = Nonsolvent Softener; P = Plasticizer

S = Solidifies or Melts; F = Flash Point

L = Latent Heat of Fusion; S = Specific Heat

Names	Formulae Emperical Structural	Mol Wt	Sp. Gr.	D = Diluent	B = Boiling Point	Vapour Pressure	Critical T. Temp. P. Pressure	Viscosity Centipoises	V. Latent Heat of Vaporization	Capillary Constant	Refractive Index	Surface Tension
p Chlorbenzyl Alcohol	C_7H_7OCl	143			S 70.5 B 235							
penta Chlorethane	C_2HCl_5 $CHCl_2 \cdot CCl_3$	202	1.709 20/4 1.6697 24	D	M −29 B 162	7/20 39/70		2.26/25	S .266/20 8 V 45		1.504 1.50250 24	
Chlor ethyl Alcohol	C_2H_5OCl $CH_2Cl \cdot CH_2OH$	80	1.213	D	S −69 F 58 B 128.8				V 123.0		1.442 B	
αβ Di Chlorethyl ether	$C_4H_8OCl_2$ $CH_2Cl \cdot CHCl \cdot OC_2H_5$	143	1.174 23°	D	B 145							
ββ Di Chlorethylether	$C_4H_8OCl_2$ $CH_3CCl_2OC_2H_5$	143	1.213 24/20	D	B 178						1.457	
Di Chlorethylether	$C_4H_8OCl_2$ $(CH_2ClCH_2)_2O$	143	1.213 20/20	D	S −51.7 F 55 B 178	2.73/20					1.457	
Tri Chlor ethylene	C_2HCl_3 $CCl_2 \cdot CHCl$	131	1.477	D	S −86.4 B 88.	58/20 73/23		0.550/25	S .233/18 8 V 58.		1.4777	
Tetra Chlorethylene	C_2Cl_4 $CCl_2 \cdot CCl_2$	166	1.624 1.6226	D	S −22.4 B 120.8	17/20 41/40		0.841/25	S .216/20 8 V 50.		1.5055 1.50547	31.74/20
mono Chlorhydrin	$C_3H_7O_2Cl$ $CH_2OH \cdot CHOH \cdot CH_2Cl$	110	1.322 1.338 32/0	S	B 213d							
di Chlorhydrin 1:3	$C_3H_6OCl_2$ $(CH_2Cl)_2CHOH$	129	1.367 1.396 22/16	D	B 174.						1.4802 16.9	
β di Chlorhydrin 1:2	$C_3H_6OCl_2$ $CH_2Cl \cdot CHCl \cdot CH_2OH$	129	1.355 1.368 32/4.2	S	B 183.							
β Chlorpropyl Acetate	$C_5H_9O_2Cl$ CH_3COOCH_2CHCl CH_3	136	1.098	S	B 152-3/760 D							
Chlornaphthalene	$C_{10}H_7Cl$	162	1.191 1.1906 21.6	D	S −17 F 116 B 258	9.8/100			S .306/n.45 21 V 74		1.633 1.63184 21.6	
Chloroform	$CHCl_3$	119	1.4890 1.4844 18	D	S −63.5 B 61.2	160/20	T 263	0.54/25	S .254/20 20 V 61.2		1.4467 1.44643 18	27.24/20
Chlor diphenyl	$C_{12}H_9Cl$ $C_6H_5C_6H_4Cl$	188										
γ Chlor propyl - Acetate	$C_5H_9O_2Cl$ $CH_3COOCH_2CH_2$ CH_2Cl	136	1.250 19°	S	B 163-5/742 D							
o mono Chlortoluene	C_7H_7Cl	127	1.080 1.0795 20.2	D	S −35.1 B 159.4				S 313/0 V 72.7/15.3		1.528 1.52486 20.2	
m mono Chlortoluene	C_7H_7Cl		1.072 1.0760 18.7	D	S −47.8 B 162.4						1.523 1.52252 18.7	
p mono Chlortoluene	C_7H_7Cl		1.071 18° + 1.0657 24.35	D	S 7.8 B 162.5				V 736/168		1.521 1.51925 24.35	
Cresyl Lactate	$C_{10}H_{12}O_3$ $CH_3CHOH \cdot COO \cdot C_6H_4 \cdot CH_3$	180		SS								
Crotonaldehyde	C_4H_6O $CH_3CH \cdot CH \cdot CHO$	70	0.859 14/4 0.8537 17.3	D	S −75 F 53 B 104						1.4373 1.43638 17.3	
Cyclobutonol	C_4H_8O $CH_2(CH_2)_2CHOH$	72	0.923 13/15	LS	B 124.1						1.4335	
Cyclobutanone	C_4H_6O $CH_2(CH_2)_2CO$	70	0.9382	S	B 99/745 B						1.4330 16°	
Cyclohexanol	$C_6H_{12}O$ $CH_2(CH_2)_4CHOH$	100	0.962 0.9463 22.6	LS	S 23.9 F 68. B 161.5			20.3/39.1	L 406 S 417/15-18 8 V 108		1.4604 37° 1.46580 22.6	34.23/16.2

Continuation of "Series on Solvents and Plasticizers" from May issue

KESSCO PRODUCTS

Acetone C P
Methyl Ethyl Ketone
Ethyl Acetate
Butyl Acetate, Nor. & Sec.
Butyl Alcohol, Nor. & Sec.
Amyl Acetate: Standard, High Test, Secondary, and Special Grades
Amyl Alcohol
Refined Fusel Oil
Butyl Propionate
Butyl Stearate
Phthalates:
Dimethyl Dibutyl
Diethyl Diamyl
Acetine
Diacetine Triacetine

SOLVENTS PLASTICIZERS
for the
PLASTIC AND CHEMICAL INDUSTRIES

The Plastic Products Industry has created a demand for plasticizers, softeners, and solvents with properties meeting special requirements.

In addition to our regular plasticizers, PHTHALATES—TRIACETINE—STEARATES we are producing special products to meet these needs and offer our cooperation.

Our technical and manufacturing experience may solve your problems. K-403

The Kessler Chemical Corporation has always confined its manufacture to solvents and plasticizers and is not offering lacquer or intermediate products.

THE KESSLER CHEMICAL CORPORATION
11th Ave. & 26th St. B. & O. Bldg. New York, N. Y.
Subsidiary of the
AMERICAN COMMERCIAL ALCOHOL CORPORATION

CASEIN PLASTICS

SHEETS and RODS

- *Non-inflammable*
- *Made in beautifully mottled and plain colors*

American Plastics Corporation
50 Union Square New York

S: Solvent SS: Solvent Softener — NSS: Nonsolvent Softener P: Plasticizer — S: Solidifies or Melts F: Flash Point — L: Latent Heat of Fusion S: Specific Heat

Names	Formulae Emperical Structural	Mol Wt.	Sp. Gr.	D: Diluent	B: Boiling Po.	Vapour Pressure	Critical T. Temp. P. Pressure	Viscosity Centipoises	V: Latent Heat of Vaporization	Capillary Constant	Refractive Index	Surface Tension
Cyclohexanol Acetate	$C_8H_{14}O_2$ $CH_3COOCH(CH_2)_4CH_2$	142 T	0.966 20/20	S	F {68 T, 58 13} B 177. T						1.4385 T	
Cyclohexanol Adipate Sipolin AOC	$C_{18}H_{30}O_4$ $(CH_2)_4[COOCH(CH_2)_4CH_2]_2$	310		SS	S 38 9 F 196 29 B 315-25 9							
Cyclohexanol Formate	$C_7H_{12}O_2$ $HCOOCH(CH_2)_4CH_2$	128 T	1.010 0	S	S <0° T F 51 9 B 162.5 T							
di Cyclo hexanol Oxalate	$C_{14}H_{22}O_4$ $[COOCH(CH_2)_4CH_2]_2$	254		SS	S 45. T B 191/13 T							
di Cyclo hexanol Phthlate	$C_{20}H_{26}O_4$ $C_6H_4[COOCH(CH_2)_4CH_2]_2$	330		P	S 66. B							
Cyclohexanol Succinate	$C_{16}H_{26}O_4$ $[CH_2COOCH(CH_2)_4CH_2]_2$	282		SS								
Cyclohexanone	$C_6H_{10}O$ $CH_2(CH_2)_4CO$	98 T	0.949 T 0.9482 16.8	S	S -45 B F 44.4 18 B 158.7 T			2.30/17.3 T	S 433/15-18 T		1.4526 T 15.3° 1.45242 T 16.8	
Cyclopentanol	$C_5H_{10}O$ $(CH_2)_4CHOH$	86 T	0.946 T 0.953 T 13.5	LS	B 141. T						1.45800 T 13.5	
Cyclopentanol Acetate	$C_7H_{12}O_2$ $CH_3COOCH(CH_2)_4$	126		S								
Cyclopentanol Formate	$C_6H_8O_2$ $HCOOCH(CH_2)_4$	112		S								
Cyclopentanone	C_5H_8O $(CH_2)_4CO$	84 T	0.9513 17.3	S	B 130.6 T			1.07 25° T			1.436 T 1.43817 17.3 T	
pp Diaminodiethyl Ether	$C_4H_{12}ON_2$ $(H_2NCH_2CH_2)_2O$	104		D	B 180-5							
a Epichlorhydrin	C_3H_5OCl CH_2OCHCH_2Cl	92 T	1.184 T 1.1927 T 11.55	S	S -25.6 T B 117 T			1.03 /2.5 T			1.4554 T 16.5° 1.44185 T 11.25	24.31 30 16.5
Penta Erythrytol-tetra acetate	$C_{13}H_{20}O_8$ $[CH_3COOCH_2]_4C$	304		P								
Mono Ethanolamine	C_2H_7ON $CH_2CH_2OHNH_2$	61	1.04 15/15 4	D	F 93 4 B 171/150 6	0.5/20 4						
Di Ethanolamine	$C_4H_{11}O_2N$ $[CH_2CH_2OH]_2NH$	105	1.10 15/15 4	D	F 133 4 B 217/150 6	<0.01 6 20						
Tri Ethanolamine	$C_6H_{15}O_3N$ $(CH_2CH_2OH)_3N$	149	1.12 6 15/15	D	F 180 4 B 277/15 4	<0.01 6 20						
Ethyl Abietate	$C_{22}H_{34}O_2$ $C_{19}H_{29}COOCH_2CH_3$	330	1.0200 23 20/20	NSS	S -45. 4 F 178. 4 B 325. 23			6.05 25°			1.4980 T	
Ethyl Acetanilide Mannol	$C_{10}H_{13}ON$ $C_6H_5NC_2H_5OCCH_3$	163 T	0.994 T 60/4	P	S 54.5 T F 108 29 B 259 T							34.6/60 T
Ethyl Acetate	$C_4H_8O_2$ $CH_3COOCH_2CH_3$	88 T	0.399 T 0.89464 8.9	S	S -83.6 T F -5 T B 77.1 T	73/20 B 72.8/20 T	T 250.1 T P 37.8 T	0.441 /25 T	S 476/20 T V 88.3 3		1.3727 T 1.37216 T 18.9	20.37 H
Ethyl Aceto Acetate	$C_6H_{10}O_3$ $CH_3COCH_2COO\cdot CH_2CH_3$	130 T	1.0465 B 0/4 1.0320 T 16.6	S	S <-80 T B 180 B			1.53 /25 T	S 476/20-100 T		1.4198 T 1.42092 T 16.6	32.5/26 T
Ethyl Aceto Glycolate	$C_6H_{10}O_4$ $CH_3COOCH_2COO\cdot CH_2CH_3$	146	1.094 20	S	F 82 B 181-95							
Ethyl Acetone	$C_5H_{10}O$ $CH_3CH_2CH_2COCH_3$	86 T	0.812 T 15/15	S	S -77.8 T B 101.7 T						1.3895 T	
Ethyl Aceto Ricinolate	$C_{22}H_{40}O_4$ $C_6H_{11}CH(OOCCH_3)$ $COOCH_2CH_3$	368		NSS								

DU PONT

R&H Chemicals

FOR PLASTIC MANUFACTURE

"P.A.C.*" FORMALDEHYDE

U. S. P. solution, containing 37% by weight HCHO. Clear and water-white. Guaranteed full strength and uniform. Modern manufacturing facilities and adequate stocks assure prompt shipments.

PARAFORMALDEHYDE

White powder. Contains not less than 95% Formaldehyde (HCHO.)

HEXAMETHYLENETETRAMINE

Fine powder. If you are interested in the manufacture of synthetic resins, consult us for specifications and prices on the above chemicals.

*REG. U. S. PAT. OFF.

THE R. & H. CHEMICALS DEPT.
E. I. DU PONT DE NEMOURS & COMPANY, INC.
Wilmington, Delaware

District Sales Offices: Baltimore, Boston, Charlotte, N. C., Chicago, Cleveland, Kansas City, Newark, New York, Philadelphia, Pittsburgh, San Francisco

JOHN J. CAVAGNARO

Engineers and Machinists

Established 1881

HARRISON NEW JERSEY

Steel Steam Platens

Die Presses and Dies

This mixer constructed with many new important features desired for efficient mixing operations

Belt or Motor Drive

Complete specifications on request

Plain or Stainless

Cavagnaro-Loomis Vacuum Mixer
(Patented)

Complete line of machinery for Celluloid & Plastic Mfrs.

Special Representative
Evarts G. Loomis
126 So. 14th St.
Newark, N. J.

S = Solvent · SS = Solvent Softener · NSS = Nonsolvent Softener · P = Plasticizer · S = Solidifies or Melts · F = Flash Point · L = Latent Heat of Fusion · S = Specific Heat

Names	Formulae Empirical Structural	Mol Wt	Sp Gr	D = Diluent	B = Boiling Point	Vapour Pressure	Critical T = Temp P = Pressure	Viscosity Centipoises	V = Latent Heat of Vaporization	Capillary Constant	Refractive Index	Surface Tension
Di Ethyl Adipate	$C_{10}H_{18}O_4$ $(CH_2)_4(COOCH_2CH_3)_2$	202	1.0076	SS	S -21. B 245							
Ethyl Alcohol	C_2H_6O CH_3CH_2OH	46	0.789 0.7917 18.35	LS	S -117.3 F 12 B 78.5	44/20	T 243.1 P 63.1	1.05/25	L 249 S .61 V 202.2		1.361 1.362 42 18.35	23/30 23.37/20
Ethyl Amine	C_2H_7N $CH_3CH_2NH_2$	45	0.689 16/15	D	S -80 B 16.6	724/15.5	T 183.2 P 55.		V 146/			30.4/9.0
Di Ethyl Amine	$C_4H_{11}N$ $(CH_3CH_2)_2NH$	73	0.711 15 0.7108 17.6	D	S -50. B 56	724/56	T 223.5 P 36.2	0.35/25	S 518/22.5 V 91.		1.405 1.387 30 17.1	16.4/56
Tri Ethyl Amine	$C_6H_{15}N$ $(CH_3CH_2)_3N$	101	0.728 0.7277	D	S -114.8 B 89.5		T 262 P 30	0.363/25			1.401 1.40032	20.9/20
Ethyl Benzoate	$C_9H_{10}O_2$ $C_6H_5COO\cdot C_2H_5$	150	1.047 1.0496 17.3	S	S -34.6 B 213.2			2.14/25	S 389/20 V 64.5		1.5063 1.50882 17.3	35.5/20
Ethyl Benzol	C_8H_{10} $C_6H_5CH_2CH_3$	106	0.868 0.8708 14.5	D	S -92.8 F 15 B 136.5/777	15.3/20		0.632/25	S 408/30 V 81.2/135		1.4959 1.49828 14.5	29.2/20
Ethyl Bromide	C_2H_5Br CH_3CH_2Br	109	1.4307 1.4555	D	S -119. B 38	28.24 20 386/20	T 231	0.3734/35.28	S 216/15-20 V 60.1/38.4		1.4239 1.42386	24.16/20
n Ethyl Butyl Carbonate	$C_7H_{14}O_3$ $CH_3COOCH_2CH_3$ $O(CH_2)_3CH_3$	146	0.92	S	P 50 29 B 169							
Ethyl Butyrate	$C_6H_{12}O_2$ $CH_3(CH_2)_2COOCH_2CH_3$	116	0.879 0.8797 18	S	S -93 B 121.3	79.2/20 43.5/43	T 293 P 30	0.63/25	S 458/20 V 73.45		1.3932 1.39302 18	24.44 24.54/20
Ethyl Carbamate	$C_3H_7O_2N$ $NH_2COOCH_2CH_3$	89	1.11 24/20	P	M +48 B 180						1.4143 52	
Ethyl Carbanilate	$C_9H_{11}O_2N$ $C_6H_5NHCOOCH_2CH_3$	165	1.1063 30/4	P	M 52 B 238						1.5376 30.4	36.5/60
Ethyl Carbanilid	$C_9H_{12}ON_2$ $C_6H_5N(C_2H_5)CONH_2$	164		P	M B 99.							
Di Ethyl Carbonate	$C_5H_{10}O_3$ $CO(OCH_2CH_3)_2$	118	0.979 0.9762	S	S -43. F 49 25 B 125.8				S 464/20-100 V 73.1/126		1.38523	26.31/20
n Ethyl-2-4-6 Trichlor acetanilid	$C_{10}H_{10}ONCl_3$ $C_6H_2Cl_3N(C_2H_5)\cdot COCH_3$	265		P	S 50-1							
Ethyl-mono Chloracetate	$C_4H_7O_2Cl$ $CH_2Cl\cdot COO\cdot CH_2CH_3$	122	1.1585	S	F 54 B 144.2				S 397/20		1.4237	
Ethyl Chlorocarbonate	$C_3H_5O_2Cl$ $ClCO_2CH_2CH_3$	108	1.139 18.2/15	S	S -80.6 B 95.						1.39738	
α β Dichlor Ethyl Chlorcarbonate	$C_3H_3O_2Cl_3$	177	1.510		B 159-60							
Ethyl Chloride	C_2H_5Cl CH_3CH_2Cl	64	0.910	D	S -138.7 B 12.5	1.0901m 15°	T 182 P 54.9 atm		S 368/0 V 920/25			
Di Ethyl Cinnamate	$C_{13}H_{16}O_2$ $C_6H_5(CH)_2COOCH_2CH_3$	176	1.0490	NSS	S 6.5 B 271.						1.55982	38.42 38.37/20
Tri Ethyl Citrate Odinol	$C_{12}H_{20}O_7$ $COH(CH_2)_3(COOC_2H_5)_3$	276	1.1369		B 294						1.44554	
Ethyl Crotonate α	$C_6H_{10}O_2$ $CH_3CHCHCOOCH_2CH_3$	114	0.919 0.9237	S	B 139		T 326				1.4242 1.42495	
β Ethyl Crotonate	$C_6H_{10}O_2$ $CH_3CHHC\cdot COOCH_2CH_3$	114	0.925 0.9246 19.6	S	B 131.2						1.42590 19.6	
Di Ethyl Cyclobutanone	$C_8H_{14}O$ $(CHC_2H_5)_2CH_2CO$	126		S								

RESINOX

Molding Resins • Molding Compounds
Laminating Varnishes

ODORLESS . . . NON-BLEEDING
WATER-RESISTANT
HIGH TORQUE STRENGTH

USE
RESINOX
FOR
EVERY
MOLDING
PURPOSE

For accuracy in molding, for faithful reproduction of the designer's art, use Resinox. . . . Resinox molds perfectly, cures uniformly, finishes with high luster, beauty, and strength. It is odorless, water-resistant, of high torque strength, and available in a wide variety of colors. Use Resinox for permanence . . . for consistent results.

KEEP IN TOUCH WITH RESINOX DEVELOPMENTS

RESINOX CORPORATION

Subsidiary of Commercial Solvents Corporation and Corn Products Refining Company, 230 Park Avenue, New York City

FINE HEYDEN CHEMICALS

FORMALDEHYDE
PARA FORMALDEHYDE
HEXAMETHYLENAMINE

These products are especially adapted for use in Plastics. Their superior purity and always uniform strength yield plastic materials of dependable and uniform quality.

HEYDEN CHEMICAL CORPORATION

50 UNION SQUARE NEW YORK CITY
180 N. WACKER DRIVE CHICAGO, ILL.
Factories
GARFIELD, N. J. PERTH AMBOY, N. J.

S = Solvent SS = Solvent Softener NSS = Nonsolvent Softener P = Plasticizer

S = Solidifies or Melts F = Flash Point

L = Latent Heat of Fusion S = Specific Heat

Names	Formulae Empirical Structural	Mol. Wt.	Sp. Gr.	D = Diluent	B = Boiling Point	Vapour Pressure	Critical T = Temp. P = Pressure	Viscosity Centipoises	V = Latent Heat of Vaporization	Capillary Constant	Refractive Index	Surface Tension
Ethyl Ether	$C_4H_{10}O$ $(CH_3CH_2)_2O$	74	0.714 0.7183 17.1	LS	S -116.2 F -41.4-20 B 34.5	425/20 442.2/20	T 193.8 P 35.5	0.223/25	S .54 V 90		1.3526 1.35424 17.1	16.5/20
Ethyl Formate	$C_3H_6O_2$ $HCOOCH_2CH_3$	74	0.906 0.9198	S	S -80.5 F -19.5 B 54.4	20.1/20 192.5/20	T 235.3 P 466	0.389/25	S 486/14-49 V 100.1		1.3598 1.35975	
Ethyl Furoate	$C_7H_8O_3$ $C_4H_3OCOOCH_2CH_3$	140	1.1776	S	S 34 B 195.5						1.4782	
Ethyl Glycolate	$C_4H_8O_3$ $CH_2OHCOOCH_2CH_3$	104	1.0826 23°	S	B 160							
Ethyl Lactate	$C_5H_{10}O_3$ $CH_3CHOHCOOCH_2CH_3$	118	1.031	S	S F 43 B 154							29.9/20
Di Ethyl Oxalate	$C_6H_{10}O_4$ $(COOCH_2CH_3)_2$	146	1.0793	S	S -40.6 B 186.1			1.76/25	S 433/20 V 68.0/185		1.41043	32.0/20
Ethyl Oxybutyrate	$C_6H_{12}O_3$ $(CH_3)_2COH\cdot COO C_2H_5$	132	0.986 20/20	S	B 147						1.4080	
Di Ethyl-diphenyl Urea	$C_{17}H_{20}ON_2$ $(C_6H_5\cdot CH_2\cdot CH_3N)_2CO$	268		P	S 79 B 325-30							
Di Ethyl Phthlate	$C_{12}H_{14}O_4$ $C_6H_4(COOC_2H_5)_2$	222	1.119 1.1203 17.7	SS	F 140 B 296.1			10.1/25			1.5019 1.50293 17.7	37.34
Ethyl Propionate	$C_5H_{10}O_2$ $CH_3CH_2COOCH_2CH_3$	102	0.8907 0.88886 20.2	S	S -72.6 F 12.5 B 99.1	60.7/20 27.7/20	T 272.9 P 33	0.53/25	S .458/20 V 80.3		1.3844 1.38385 20.2	23.32 24.2/20
Ethyl Salicylate	$C_9H_{10}O_3$ $OHC_6H_4COOCH_2CH_3$	166	1.31 1.1355 14.4	D	S +1.3 B 231.5			1.803/14.5			1.5226 1.52511 14.4	38.33/20.5
Ethyl Sebacate	$C_{14}H_{26}O_4$ $(CH_2)_8(COOC_2H_5)_2$	258	0.965 16°	SS	M +1. B 308.			5.1/25				32.94/22.2
Ethyl Stearate	$C_{20}H_{40}O_2$ $CH_3(CH_2)_{16}COOCH_2CH_3$	312		NSS	S 33.7 B [199/10 2244			3.75/50				
Di Ethyl Tartrate	$C_8H_{14}O_6$ $(CHOH\cdot COOCH_2CH_3)_2$	206	1.202 15/15	S	S 17. B 280.						1.4476	37.8/25
Ethyl-p-Toluolsulfonamid				P								
Ethylene Diamine	$C_2H_8N_2$ $(NH_2CH_2)_2$	60	0.892 24.1/4 0.899 20.1	D	S 8.5 B 117.			1.54/25			1.45400 26.1°	
Ethylene Dibromide	$C_2H_4Br_2$ $CH_2Br\cdot CH_2Br$	188	2.1823 2.1768	D	S 10. B 131.7	9.2		1.698/20.63	L 13.7 S 174/20 V 462/		1.5379 1.53789	38.75/20
Ethylene Dichloride	$C_2H_4Cl_2$ $CH_2Cl\cdot CH_2Cl$	99	1.257 1.2521	D	S -35.3 F 17. B 83.7	65/20		0.8139/21.84	S .301 V 87.5		1.4446 1.44432	30.50
Ethylene Trichloride	C_2HCl_3 $CHCl\cdot CCl_2$	131	1.477 1.4458 22	D	S -86.4 B 88.			0.550/25	S .223/18 V 58.		1.4777 1.47192 22	
Ethylene Glycol	$C_2H_6O_2$ $CH_2OH\cdot CH_2OH$	62	1.115 1.1176/4	D D	S -17.4 F 116. B 197.4	0.9/20 39/120	21/20	17.4/25	L 42.9 S .575/20 V 191.0/197		1.4274	
Ethylene Glycol mono Acetate	$C_4H_8O_3$ $CH_2OH\cdot CH_2COOCH_3$	104	1.108	S	F 101 B 182.							
Ethylene Glycol di-Acetate	$C_6H_{10}O_4$ $(CH_3OOC\cdot CH_2)_2$	146	1.104	S	S -31. F 97. B 190.5	24/100					1.4150	
Ethylene Glycol mono Amyl Ether	$C_7H_{16}O_2$ $CH_2OH\cdot CH_2O(CH_2)_4CH_3$	131		S								
Ethylene Glycol di Amyl Ether	$C_{12}H_{26}O_2$ $CH_3(CH_2)_4OCH_2CH_2O(CH_2)_4CH_3$	202		S								

—To be continued in July

NATIONAL

INDUSTRIAL CHEMICALS

SERVING THE SYNTHETIC RESIN, PLASTIC, SOLVENT AND PLASTICIZER INDUSTRIES.

Phthalic Anhydride
Maleic (Toxilic) Acid
Maleic (Toxilic) Anhydride
Malic Acid
Succinic Acid
Succinic Anhydride
Fumaric Acid

Descriptive booklet showing our complete line of coal tar derivatives on request.

We solicit your inquiries on all organic products.

NATIONAL ANILINE AND CHEMICAL COMPANY, INC.

40 Rector Street New York, N. Y.

Branches and Distributors Throughout the World

INTERMEDIATES

We are headquarters for

PLASTICIZERS, SOLVENTS & RAW MATERIALS

for the manufacture of

PLASTICS

LACQUERS

& COATINGS

•

The following are some of our specialties

CELLULOSE ACETATE

•

DIBUTYL PHTHALATE
DIETHYL PHTHALATE
DIMETHYL PHTHALATE
DIBUTYL TARTRATE
TRIACETIN
TRIPHENYL PHOSPHATE

•

CRESYLIC ACID
SODIUM ACETATE
ACETIC ANHYDRIDE

•

CASEIN

AMERICAN-BRITISH CHEMICAL SUPPLIES, Inc.

180 Madison Avenue New York, N. Y.

Telephone Ashland 4-2265

Affiliated Companies:

KAY-FRIES CHEMICALS INC.

(Manufacturers of Organic Chemicals)

New York City and West Haverstraw, N. Y.

CHAS. TENNANT & CO. (Canada) LIMITED

372 Bay Street Toronto 2, Canada

Plastics and Coating News

NRA Administrator Johnson Announces Premium Regulations—Lacquer and Molded Fields Interested in A.S.T.M. Meeting—Tariff Commission To Hold Camphor Hearing—Donald New NEMA Managing Director—Bakelite Holds Sales Conference

NRA Administrator Hugh S. Johnson May 25 announced determination of a policy for regulation of the use of premiums which will be applicable to all codes hereafter approved and which will govern modification of inconsistent provisions in codes already approved if such modification is sought by the affected industry or is deemed necessary to correct hardships or abuses.

"The premium problem has proved a troublesome one," declared the Administrator in the formal announcement. "There is irreconcilable conflict between the desires of certain members of non-premium industries on the one hand and members of industry engaged in the manufacture and distribution of premiums on the other hand. This matter has been thoroughly canvassed by NRA and all advisors have participated in the formulation of the final policy herein announced.

"The manufacturers of novelty goods which are extensively used in premiums have built up a considerable industry and employed a considerable number of persons. In addition, other products of industry not essentially related to the manufacture of premiums are purchased for premium use.

"In view of the extent of the industry, the widespread use of premiums and the fact that premiums at times lend a desirable flexibility to rigid prices, it appears that there should not be a general prohibition against their use. On the other hand, certain uses of premiums may lead to increase cost of selling, deception of buyers, and other abuses which justify a careful regulation of their employment.

"The following policies should govern premium clauses in codes: 1. there should be no general provisions prohibiting the use of premiums; 2. certain uses of premiums would constitute methods of evading trade practice provisions; for example, provisions against selling below cost and open price provisions. The proper way to prevent such evasion of any trade practice provision is careful drafting of the provision in question. For example, in a provision prohibiting selling below cost, it should be provided that all premiums should be included in the computation of cost. Similarly, in an open price provision, it should be required that all terms and conditions of sale, including premiums, must be filed.

"3. Although there should be no general prohibition against the use of premiums, the use of premiums in the following ways may be prohibited: a. the use of premiums in ways which involve commercial bribery in any form; b. the use of premiums in ways which involve lottery in any form. The term "lottery" should be construed to include, but without limitation, any plan or arrangement whereby the premiums offered differ substantially in value from customer to customer of the same class, except as a result of differences in quantities purchased; c. the use of premiums in ways which involve misrepresentation, or fraud, or deception in any form, including, but without limitation, the use of the word "free," "gift," "gratuity," or language of similar import in connection with the giving of premiums for the purpose or with the effect of misleading or deceiving customers; d. the giving of premiums to any customers when such premiums are not offered to all customers of the same class in trade area."

A.S.T.M. Meets June 21

At least 2 reports of A.S.T.M. committees will prove of more than passing interest to those in the lacquer and plastic fields. The 37th annual meeting will be held at the Chalfonte-Haddon Hall, Atlantic City, June 25-29. Report of Committee D-1 on Pre-

MARCH PAINT, VARNISH AND LACQUER SALES

Statistics on sales of paint, varnish, and lacquer products, based on data reported to the Bureau of the Census by 586 identical establishments, are presented in the table below, which shows, by months, the total volume of sales reported, the volume reported by 242 establishments which are unable to classify their sales into trade and industrial, and the volume reported by 344 establishments which have classified their sales into trade and industrial (paint and varnish, and lacquer).

Year and Month	Total sales reported by 586 establishments	Classified Sales Reported by 344 Establishments				Unclassified sales reported by 242 establishments
		Industrial Sales			Trade sales of paint varnish and lacquer	
		Total	Paint and Varnish	Lacquer		
1934						
January	$20,643,659	$6,015,030	$4,290,923	$1,724,107	$7,470,517	$7,158,112
February	17,715,447	5,639,413	3,714,128	1,925,285	6,256,162	5,819,872
March	23,193,396	7,105,176	4,768,864	2,336,312	8,504,997	7,583,223
1933						
January	$11,275,396	$3,529,886	$2,386,947	$1,142,939	$4,168,260	$3,577,250
February	11,665,734	3,423,033	2,445,378	977,655	4,771,706	3,470,995
March	13,578,568	3,391,947	2,484,550	907,397	5,788,213	4,398,408
April	19,043,787	4,677,309	3,143,803	1,533,506	8,582,411	5,784,067
May	26,241,044	5,991,938	4,298,455	1,693,483	11,788,573	8,460,533
June	27,813,233	6,827,509	4,832,551	1,994,958	12,443,998	8,541,726
July	22,090,187	6,406,184	4,493,516	1,912,668	8,627,400	7,056,603
August	20,620,811	6,323,475	4,754,701	1,568,774	7,840,359	6,456,977
September	19,097,803	5,544,686	3,975,917	1,568,769	7,462,113	6,091,004
October	18,944,106	4,949,755	3,721,420	1,228,335	7,376,012	6,618,339
1932						
November	16,234,234	4,656,353	3,466,174	1,190,179	6,566,157	5,011,724
December	16,156,062	4,418,023	3,428,376	989,647	6,157,567	5,580,472
Total (Year)	$222,760,965	$60,140,098	$43,431,788	$16,708,310	$91,572,769	$71,048,098
January	$15,894,506					
February	16,270,822					
March	19,089,005	(a)	(a)	(a)	(a)	(a)
April	22,612,193					
May	24,981,441					
June	19,637,358	$4,685,399	$3,617,719	$1,067,680	$8,734,330	$6,217,629
July	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
August	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
September	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
October	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
November	12,492,818	3,599,319	2,639,062	959,957	5,196,766	3,696,733
December	9,484,520	3,222,770	2,186,706	1,036,064	3,506,715	2,755,035
Total (Year)	$203,323,315	.....	.....	.....	.....	.....

(a) Comparable statistics not available.

MAKALOT PRODUCTS

ARC RESISTING MATERIAL

For the Automotive Supplier. Any Color Desired.

SHOCK RESISTANT MATERIALS

High Dielectric and Low Water Absorption
Maximum Shock Resistance
Long Flow with Minimum Resin Separation and Beautiful Finish

LOW LOSS MOLDING COMPOUNDS

Natural Color suitable for Textile Industry, Bobbins, etc. Also in Black, Brown, Mottled and other colors for the Insulating Trade.

HIGH HEAT

Superior Strength
No Sticking

No. 75-D is an all Mineral Filler.

No. 75-H Lower Gravity suitable for competitive Heater Plugs

Best By Test For Sustained Heat Resistance

RICHWARE

A Lustrous Molding Compound
Pastel and Brilliant Colors

Tasteless and Odorless, and as it can be sterilized and still retain its beautiful finish without cracking or warping it fills a real want for a material suitable for molding all kinds of Table and Kitchen Ware such as cups, saucers, spoons, dishes of all shapes and sizes, etc., etc.
RICHWARE has double the strength of the ordinary molding compound. Let us see if we can not help you.

MAKALOT CORPORATION

262 Washington Street, Boston, Mass.
Factory: Waltham, Mass.
Manufacturers of Molding and Paper Impregnating Resins, Lacquers, Varnishes and Basing Cement

Modern

Molding

Today's requirements call for the ultimate in modern molding. American Record Corporation answers the call with modern molding methods, modern plastic materials, modern designs, modern colors. Call in an ARC representative to discuss your molding requirements.

SCRANTON FOR 50 YEARS BUTTON BRAND

AMERICAN RECORD CORPORATION

SCRANTON, PA.

New York Chicago Detroit Cleveland Hollywood, Cal.

WOOD FLOUR

THE MOST WIDELY-USED FILLER FOR PLASTICS. MADE BY A NEW PROCESS, EXCLUSIVE WITH BECKER-MOORE, THE LARGEST DOMESTIC SUPPLIERS.

Bright in Color

Uniform Screen Analysis

BECKER-MOORE & CO., INC.

NORTH TONAWANDA

NEW YORK

servative Coatings for Structural Materials (Allen Rogers, chairman) presents as tentative, new specifications for titanium barium pigment, for titanium calcium pigment, for titanium dioxide, for zinc sulfide, for high zinc sulfide lithopone and for amyl acetate (from fusel oil); also methods of test for mass color and tinting strength of dry color pigments and extensive revision of existing method for tinting strength of white pigments. Submits tentative revisions of standard methods of routine analysis of dry red lead; of white linseed oil paints; of yellow and orange pigments containing chromium compounds, blue pigments and chrome green; also methods of sampling and testing shellac. Recommends adoption as standard, with revisions, of tentative specifications for shellac varnish and for centrifuged shellac varnish. Presents revisions of tentative specifications for petroleum spirits (mineral spirits), and methods of testing nitrocellulose clear lacquers and lacquer enamels. Recommends adoption as standard of tentative revision of standard specifications for basic carbonate white lead. Discusses activities of subcommittees on accelerated tests for protective coatings, on varnish, on paint thinners, etc.

Insulation Materials

Report of Committee D-9 on Electrical Insulating Materials (H. L. Curtis, chairman) presents interesting summary of subcommittee activities on insulating varnishes, paints and lacquers; on molded materials; on plates, tubes and rods; on insulating mineral oils; on solid filling and treating compounds; on electrical tests and on insulating papers and fabrics. Submits new tentative methods of testing molding powders used in manufacturing electrical insulators. Recommends tentative revision of standard methods of testing molded materials and adoption of revision in standard methods of testing electrical porcelain. Presents method of measuring power factor and dielectric constant at commercial frequencies. Recommends methods for measuring coefficient of expansion and for power factor and dielectric constant of solid treating and filling compounds. Presents test for folding endurance of untreated insulating paper. Recommends revisions in tentative methods of testing varnishes, laminated sheet materials, varnish cloth and tape, laminated tubes; and specifications for black biascut varnished cloth tape. Proposes revisions of the tentative methods of testing sheet and tape materials for dielectric strength. Tentative test for thickness using machinist's type micrometer has been enlarged to apply to solid electrical insulation in general.

Coatings

Code of Fair Competition for the Spray Painting and Finishing Equipment Manufacturing Industry has been approved. By the provisions of the code, work is limited to 8 hours per day and 40 hours per week with the exception of employes engaged in emergency maintenance or repair work, but to provide for seasonal demands a tolerance is permitted for 6 weeks in any 26 week period. However, time and one-half must be paid for all overtime. Minimum wages are fixed at 40 cts. for males and 35 cts. for females per hour. It is estimated that during its peak in '29 industry employed 1,100 persons. This dropped to approximately 500 in '33. Under wage rates established, industry's wages will be returned to approximately '29 levels.

Blaugas Appoints

Northwestern Blaugas' chemical division has appointed O. D. Bluthardt, 59 W. Austin ave., Chicago, as its representative on phenolic synthetic resins in the Middle West. Mr. Bluthardt also represents R.B.H. Lacquer Base in mid-west territory.

Pledges Cooperation

Synthetic Resin Manufacturers' Association, through Secretary Wittenburg, has forwarded to the N.P.V. & L. Association resolutions adopted pledging cooperation in development of products of the industry.

Personnel Changes

E. R. Fitz Gerald is now assistant to Don Gilles, General Paint, Los Angeles. . . . A. C. Horn (L. I. City lacquer producer) has appointed Arthur H. Mann, 320 S. E. Riverside ave., Evansville, Ind., as general representative. . . . Gunther H. Schmidt, formerly with General Paint, is now superintendent, E. A. B. Paint. . . . Norman W. Drescher, who recently resigned from Valentine, has become general sales manager for American Asphalt Paint and subsidiaries.

Norman W. Drescher

Celebrates 10th Anniversary

Roxalih Flexible Lacquer is celebrating its 10th anniversary by moving its plant to much larger quarters at 800 Magnolia ave., Elizabeth, N. J.

Cast

Judge Moscowitz, U. S. District Court, Brooklyn, signed last month a consent degree, ending the patent suit brought about a year ago by Catalin against Marblette. Litigation has been settled by Catalin granting a license to Marblette.

Camphor Tariff Hearing

Tariff Commission will hold a hearing June 21 pursuant to provisions of Paragraph 51 of the 1930 Tariff Act to ascertain ratio of domestic production to domestic consumption by quantity of synthetic camphor in 6 months' period ending June 17, '34. Duty is 5c on synthetic against 1c for natural, providing a certain minimum ratio is maintained by domestic manufacturers. Du Pont is the only domestic producer.

Laminated

Import duty of laminated sheets of which any synthetic resin or resin-like substance is chief binding agent, is reduced to 15c a lb. and 25% ad valorem, according to Presidential proclamation, following a Tariff Commission investigation. Former rate—25c and 30% ad valorem.

This investigation was instituted in compliance with a Senate Resolution. Germany is the principal competing country. Imports amounting to about 217,000 lbs. in the period Sept. 2, '29 to June 17, '30, came from that country. During the greater part of the years '28 and '29, laminated sheets were excluded from entry into the U. S. as a result of an investigation by the Tariff Commission of unfair methods of competition and unfair acts in the importation and sale of laminated sheets. Such sheets are not now excluded. Prior to the exclusion order imports came principally from Germany. With the exception of 10 lbs. imported from Canada in Dec. '32, there have been no imports under the Tariff Act of 1930 up to and including July, 1933.

PREMIUMS
• in plastics

If you have an item suitable for use as a premium, we have the salesmen and the contacts successfully and profitably to market it for you.

• 101 Park Ave., New York

CHURCH & MORSE
Incorporated

Complete Service:

Beginning with the designing of the moulds to the finishing of moulded products—including the moulding in of metal inserts—as per your specifications.

Let us quote on your requirements

Plastic Moulding of Beetle and Bakelite of the better kind

Kuhn & Jacob Moulding & Tool Co.

503 Prospect St. Trenton, N. J.

N. Y. Office: Phone Defender 3-6442
Phila. Office: Phone Sagamore 5173
Detroit Office: Phone Trinity 2-0122

Facts About NITROCELLULOSE

No. 3 *Acquainting you with a product you can probably use*

COATED TEXTILES

The increased use of nitrocellulose for coating textiles of all types should appeal to many manufacturers. Here's a market that has been barely scratched. Advantages of beauty, durability, and waterproofness are too important to be passed by.

TAILOR MADE

Research and improved manufacture make it possible to produce nitrocellulose of various types and viscosities. As a matter of fact, Hercules can tailor-make it to your own specifications.

START TO FINISH

There is a sense of pride in following through from start to finish and doing a conscientious job, too. That's the way we feel about Hercules Nitrocellulose. We buy the raw fibers, purify them ourselves, and make the finished nitrocellulose. Every operation is in our own plants. That's a reason for its uniform high quality.

HERCULES NITROCELLULOSE
HERCULES POWDER COMPANY
INCORPORATED
982 Market Street, Wilmington, Delaware

AAA-21

Manufacturers of Pyroxylin Sheets and Rods. Molders of Bakelite, Durez, Pyroxylin, Lumarith, Beetle, Plaskon, etc.

Auburn BUTTON WORKS INC.

Based on experience, backed by reputation, Auburn offers a complete molding service.

Constantly adding to our processes and equipment, we now offer transfer—or "injection" — molding for intricate parts. We will be glad to help solve your molding and fabricating problems.

Office and Plant - - Auburn, N. Y.

Domestic producers operate plants in New York, Delaware, Pennsylvania, and Ohio. Output of the 7 principal companies amounted to 11,964,000 lbs. in '29 and 6,707,000 lbs. in '30.

Ford Uses Laminated

Apollo ChromFlex mounted on Haskelite plywood will be used to embellish the interiors of the Ford Bldg., at the World's Fair.

King Mfg. Moves

J. M. King Manufacturing (plastic fabricator) has moved to larger quarters at American and Diamond sts., Philadelphia.

Formica Employes Strike

Formica Insulation's employes were on strike last month. Company now has 450 at work, 50 more than when the walkout occurred.

Code Ready

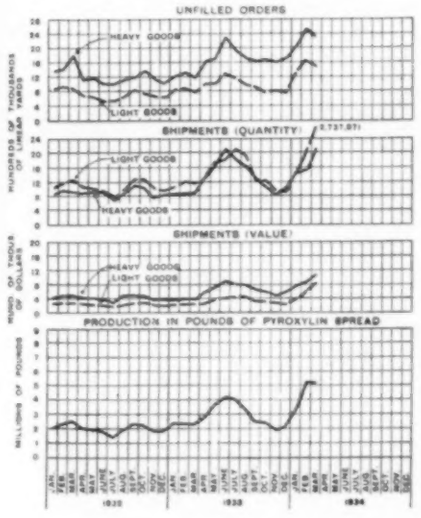
Code for the laminated phenolic products industry has been approved by the NEMA Board of Governors and is ready for presentation to NRA.

Cellulose

Following table presents monthly statistics relating to pyroxylin-coated textiles based on data reported to the Bureau of the Census by manufacturers comprising most of the industry. The data include products manufactured by spreading nitro-cellulose or pyroxylin preparations, either by themselves or in combination with other materials, upon grey goods, such as sheetings, drills, ducks, sateens, moleskins, etc.

PYROXYLIN-COATED TEXTILES

MARCH, 1934
COMPARED WITH PRECEDING MONTH



Item	1934 March	1934 February
NUMBER OF MFGRS. REPORTING	20	20
LIGHT GOODS:		
Unfilled orders (a)—		
Linear yards	2,737,971	2,221,604
Value	$803,893	$636,454
Shipments—		
Linear yards	1,518,846	1,654,288
HEAVY GOODS:		
Shipments—		
Linear yards	2,115,621	1,589,901
Value	$1,145,855	$844,688
Unfilled orders (a)—		
Linear yards	2,292,470	2,555,676
PYROXYLIN SPREAD (b):		
Pounds	5,199,243	5,278,210
MONTHLY CAPACITY (c):		
Linear yards	12,822,689	12,822,689

(a) Orders on hand at the close of the current month (reported in yards only) exclusive of contracts with shipping dates unspecified.

(b) Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly.

(c) Based on a maximum quantity of 1.27 to 1.30 sateen, coated to a finished weight of 17½ ounces per linear yard, in a 24-hour working day, 26 days to a month.

* Revised. Certain establishments discovered errors in capacity figures previously reported.

Jap Cellulose Acetate

Export figures indicate that the Japanese cellulose acetate plastics industry is operating at a very high rate of activity. New pyroxylin plant is now in the course of construction which will have a capacity of 3,500 tons annually.

It is reported that Paris dressmakers are creating models from materials which are in part cellophane-like materials.

Lower Cellophane Prices

Du Pont Cellophane has further reduced price of Cellophane transparent wrapping. Regular plain transparent Cellophane, whose old price was 40 cts. a lb., has been reduced to 38 cts.; moisture-proof Cellophane, whose old price was 58 cts. a lb., has been reduced to 52 cts.

Officials of the company, in commenting on the reduction, stated it was made possible through the wide adoption during the past year of Cellophane on a number of new products, principally variety breads and sweet dough products of the baking industry. Increased manufacturing efficiency more than offset the higher labor rates and raw material costs in effect at the present time. This makes the 16th reduction since the domestic manufacture of Cellophane was started in '24.

Molded

Ackerman Rubber & Plastic Molding has been formed by F. J. Ackerman, president and general manager, and A. C. Fulton, vice-president and

F. J. Ackerman

chief engineer, with offices and plant at 986 E. 200 st., Cleveland. Latest type molding presses have been in-

CELLULOSE PLASTIC PRODUCTS

(Nitro-cellulose and Cellulose-acetate Sheets, Rods, and Tubes)

March, 1934

Compared with preceding months

Bureau of the Census presents, in the following table, monthly statistics on production and shipments of cellulose plastic products (sheets, rods, and tubes) for March, 1934, based on data furnished by 10 identical manufacturers. Statistics are also shown for 8 identical manufacturers from January to July, and for 10 identical manufacturers from August to December, inclusive, 1933. Segregated data for nitro-cellulose and cellulose-acetate products, are not available prior to January, 1933.

Production and Shipments (Pounds)

Year and Month	Nitro-Cellulose: Sheets Production	Sheets Shipments	Rods Production	Rods Shipments	Tubes Production	Tubes Shipments	Cellulose-Acetate: Sheets, Rods, and Tubes Production	Sheets, Rods, and Tubes Shipments
January	734,085	701,581	138,590	160,081	75,106	67,853	357,836	377,346
February	916,646	849,552	159,936	133,585	75,315	62,473	435,690	418,027
March	1,194,455	815,892	162,202	173,628	78,299	62,135	405,280	349,102
Total (3 mo.)	2,845,186	2,367,025	460,728	467,294	228,720	192,461	1,198,806	1,144,475
January	504,813	625,392	74,872	115,434	12,812	29,329	167,856	160,272
February	490,290	593,942	78,904	100,092	16,248	25,711	141,628	125,073
March	454,506	611,840	63,188	87,784	17,472	32,525	119,400	117,344
Total (3 mo.)	1,449,609	1,831,174	216,964	303,310	46,532	87,565	428,884	402,689
April	473,333	624,727	104,817	130,853	26,198	27,091	149,402	211,435
May	787,614	774,424	161,784	126,195	32,684	36,992	234,811	221,345
June	912,742	959,194	156,830	139,772	41,467	45,057	242,013	220,686
July	1,027,812	916,612	158,250	160,851	42,100	41,467	192,381	221,751
August	1,290,521	1,257,981	254,249	236,730	40,364	56,142	230,013	231,879
September	1,307,052	1,158,080	241,558	232,725	49,263	58,962	213,996	229,629
October	1,056,328	991,557	254,375	216,191	76,291	69,258	207,327	217,892
November	641,059	827,544	189,668	134,750	78,712	63,967	257,872	278,774
December	562,152	944,821	163,317	183,471	72,428	92,673	325,412	352,362
(year) Total	9,508,222	10,286,114	1,901,812	1,864,848	506,039	579,174	2,482,111	2,588,442

Plastic Molded Bumper Shoes

permanently prevent squeaks and rattles in automobile doors, yet never require oiling or greasing.

This dovetail assembly supplied by the world's largest manufacturer of automobile hardware is now standard equipment on six leading makes of cars.

It was developed by our engineers and is typical of the problems we are solving daily. Our engineers will be glad to assist on your problems.

CHICAGO MOLDED PRODUCTS CORP.
2146 Walnut St. Chicago, Ill.

"Standard" Disc Cutting Off Machine

A new cutting-off machine for

CATALIN—
MARBLETTE—

and similar plastics. Equipped with 16 inch wheel. Will cut 4½ inch round rod, and 4 inch square.

Has a device for holding the pieces while being cut that prevents slipping of work and breakage of wheels.

Smooth, quick, accurate cutting.

Write for full information

WE MANUFACTURE OTHER PLASTIC AND CELLULOID WORKING MACHINERY

STANDARD TOOL CO.
75 WATER STREET
LEOMINSTER MASS.

Natural or Dyed Cotton Flocks of Superior Quality

We are suppliers to all the leaders in the Plastic Moulding Industry.

THEY KNOW QUALITY!

Write for samples and quotations

Claremont Waste Mfg. Co.

CLAREMONT, N. H.

GOOD USED MACHINERY

Every item shipped from our shops at Newark, N. J., is thoroughly overhauled and rebuilt.

PREFORM MACHINES—
2—Stokes Rotary B 16 punch, 5/8"
1—Colton 3B, single punch
1—Colton No. 4 single punch, 1"
Several Smaller Machines, Power and Hand.

MIXERS—4—W. & P. Steam Jacketed Mixers, 100 and 150 gals.; 1—Day Mogul 5 Gal. Jacketed Mixer; 1—No. 3 Banbury Mixer; 4—Triumph dbl. arm 200 gal. motor driven.

STILLS—4—Copper, Steam Jacketed Stills, 300, 150, 50 gals.

PULVERIZERS—All types of Hammer Mills; Raymond and other makes of fine Pulverisers; Crushers, all sizes and types. Send for Bulletin No. 15.

ACCUMULATORS—Various sizes; SPECIAL: 1—Watson-Stillman Hydro Pneumatic Accumulator, complete with motor driven air pump and motor driven Watson-Stillman Hydraulic Pump, four cylinder. 1½" x 2".

MISCELLANEOUS—Hydraulic Presses, Vibrating Screens, Mixing and Converting Rolls, Color Grinding and Mixing Equipment, Vacuum Shelf Dryers, Filter Presses, Impregnators, Kettles, Masticators, Pumps, Tanks, etc.

We Pay Cash For Your Idle Machinery—Single Items or Complete Plants

CONSOLIDATED PRODUCTS CO., INC., 13-14 Park Row, N. Y. C.

Visit our shops and yards at 335 Doremus Avenue, Newark, N. J., covering six acres. BARCLAY 7-0600

stalled, and the Company is well-equipped to handle even the most intricate mechanical or artistic work.

A complete service-engineering, design, and development of molded hard and soft rubber products and plastic materials is offered. Vice-president Fulton was formerly chief engineer, Aetna Rubber, and is an authority on molding.

Bitter Strife

Militant strikers laid siege May 23 to Electric Auto-Lite's plant at Toledo, where 1,800 workers and company officials were gathered fearing to run the gauntlet of the mob outside. Fifteen National Guard units were mobilized in nearby cities ready to move in and take charge of the situation.

Stones and bricks were hurled by strikers in sporadic clashes with police who used tear gas in checking the strikers. Fifteen hundred policemen circulated in the crowd of 6,000 strikers and sympathizers outside the plant ready to repulse an attack. Electric Auto-Lite maintains a large molding unit.

Donald With NEMA

W. J. Donald, who assumes the duties of managing director of National Electric Manufacturers Association (NEMA), is well fitted by previous experience to give forward leadership to the manifold activities of the Association, as the successor to A. W. Berresford, who announced his resignation as effective May 3.

As managing director of the American Management Association from '21 through '32, Mr. Donald helped build that organization from a membership of 100 members to nearly 5,000 through an expansion of the Association's program from one concentrating on personnel administration to one of wide executive scope including general management, financial management, managerial accounting, insurance, office management, personnel administration, industrial marketing, consumer marketing, public relations, job order production and mass production. Under his aegis the organization developed the valuable Packaging Conference and Exposition.

Bakelite Sales Conference

A two-day sales conference, which ended with a banquet at the Montclair, N. J. Golf Club, was held by Bakelite May 1-2. First day was devoted to executive sessions, 2nd to the outing and banquet which was attended by 125 executives and department heads. At the latter meeting, brief talks were given, acquainting the personnel with progress made in the various company divisions.

On Wednesday, May 9th, the Bakelite "Old Timers" held the 1st of an annual series of banquets at Hotel Deauville, Somerville, N. J. Only those who had been with the company more than 10 years were eligible to attend. Out of the 100 "old timers" present, a larger percentage were celebrating more than 20 years association with the company.

Molded Group Meets

NEMA Molded Insulation Group at a meeting held May 18 discussed code and trade practices. R. Coleman, G.E., was elected to represent the Section at the annual Hot Springs meeting. Those attending included G. K. Scribner, Boonton Molding; A. S. Blackinton, Associated Attleboro Manufacturers' Inc.; P. Huidkoper, American Insulator; Hans Wanders, Northern Industrial Chemical; W. A. Freyer, Auburn Button Wks.; R. Cunningham, Bryant Electric; H. M. Burt, Royal Molding; and R. Coleman, G. E.; and R. C. Gilmore, Jr., PLASTIC PRODUCTS.

A Correction

News item appearing in April PLASTIC PRODUCTS, p. 193, stated that Rocamco, L. I. City, had taken over Tech-Art Plastics, and that all the equipment was being moved from Boonton, N. J. This is not correct and the firm of Racamco has not succeeded Tech-Art. Tech-Art Plastics, will continue to do custom molding at Boonton and there is no corporate connection between the 2 companies. In a circular letter sent to the trade Tech-Art, through R. Rochester, vice-president and general manager, stated that Rocamco had not absorbed Tech-Art; that D. Gray Maxwell was no longer connected with the company; and that the new production plant at 40-36 22d st., L. I. City, is now running on production products only and the hand molding is still being done at Boonton. N. Y. office is now located at the L. I. City address.

Company Booklets

No. 62. Bakelite Corp., 247 Park ave., N. Y. City *"Bakelite Review"* for April contains an even greater number of new, novel and interesting uses of various Bakelite products than is generally customary. So varied has the uses for plastic materials become that it is advisable for practically all industries to watch for developments in the molded and synthetic resin field. One splendid way to do this is to receive the Bakelite Review regularly.

No. 63. E. I. du Pont de Nemours & Co., Wilmington. May issue of the *Du Pont Magazine* features an article on "Fast and Fugitive Colors" by well-known George H. Johnson, director of research, American Institute of Laundering; another article on better painting results in mills, plants, etc., by Donald Bauder; a page of photographs of du Pont and Grasselli chemical specialties dressed up in new, attractive containers; a very interesting article on "Some Unusual Applications of Cellophane."

No. 64. General Plastics, North Tonawanda, N. Y. May *Durez Molder* is just as full of real news and trade gossip as usual. Its snappy editorial comment is refreshing.

No. 65. General Plastics. *Closure News* presents the most novel new packaging jobs "topped" off with "Durez" tops.

No. 66. Kessler Chemical Co., Chrysler Bldg., N. Y. City. A 4-page circular describes in detail "Kesscol M-A" which was developed to meet the demand for a more economical low boiling solvent.

No. 67. Parker Rust-Proof Co., Detroit, Mich. "A Common Cause of Paint Failure and its Scientific Prevention" is an interesting and instructive 4-page booklet.

No. 68. R. T. Vanderbilt Co., 230 Park ave., N. Y. City. Durite No. 1301 is a new leaflet in the series on "Durite" (phenolic varnish resin) and discusses "The Cost of Mixtures of Durite No 1301 and Ester Gum."

No. 69. American Instrument Co., Washington, D. C. Bull. 1521 describes a new laboratory heater and rheostat designed for distillation, extraction, evaporation and a host of other laboratory uses.

No. 70. American Lava Corp., Chattanooga. A new catalog describes and illustrates "Lava" and "Alsimag"-made-to-order ceramic parts for various industries.

No. 71. Bailey Meter Co., 1050 Ivanhoe Road, Cleveland. Engineers and executives responsible for the economical generation of steam will be vitally interested in the new 32-page bulletin "Savings Effected by Bailey Boiler Meters". Bulletin includes actual operating data showing the nature and amount of savings effected in over 20 typical installations of Bailey Boiler Meters which cover a wide range of fuels, methods of firing, types and sizes of boilers. It contains handy indexes of the type, size, method of firing boilers and methods by which savings are effected. Under each subject is listed the page numbers on which examples may be found. A tabulation of plant data listing major equipment, and a summary of savings showing investment, depreciation, interest, maintenance, net annual saving and net annual return on the investment are included for each of the various samples cited.

No. 72. The Brown Instrument Co., Philadelphia. Catalog No. 6702 describes new Brown indicating thermometer and pressure gauge controller. Several new and revolutionary departures are incorporated in this new design.

No. 73. The Brown Instrument Co. Folder 85-10 illustrates the importance of automatic temperature control.

No. 74. H-B Instrument Co., 2518 N. Broad st., Philadelphia. Blue Book, Part I is a catalog showing a complete line of thermometers specially adapted to the chemical industry. Contains a wealth of statistical data and should prove invaluable to plant managers, operating executives, etc.

No. 75. The Hydraulic Press Manufacturing Co., Mount Gilead, Ohio. The Hydraulic Press reports briefly with the aid of photographs on new and interesting hydraulic press jobs.

No. 76. Illinois Testing Laboratories. Bulletin 1727 covers the "Alnor" Pyrocon combination pyrometer and type 1755 pyrometer for measuring surface temperatures of flat surfaces such as molds, dies, platens, plates and other similar surfaces either metallic or non-metallic.

No. 77. The Northern Blower Co., W. 65th st. and Barberton ave., Cleveland. A series of monthly folders dealing with "dust-hazards" and their prevention in various industries is being issued by this company. Data will be dealt with in a strictly unbiased manner. It is planned to make the complete series a valuable record which will assist executives in eliminating the dangers of occupational sickness among employes, of fire and explosion, etc.

Plastic Products
25 Spruce Street
New York City

I would like to receive the following booklets. Specify by number, viz. Bul. 1: Bul. 2, etc.....

.....

Name .....
Title .....
Company .....
June Address .....

SOLVE

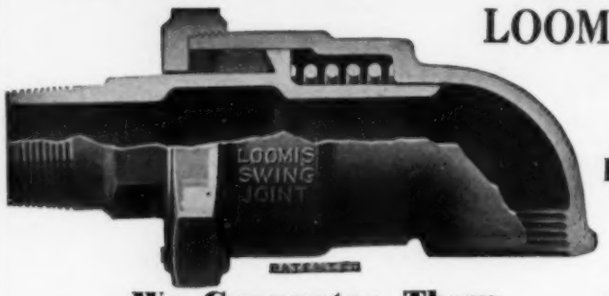
Your flexible connection problems by applying

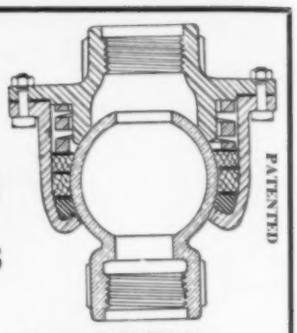
LOOMIS SWING JOINTS

OR

FOSTER BALL JOINTS

Manufactured and sold by





EVARTS G. LOOMIS

We Guarantee Them — 126 So. 14th St. — Newark, N. J.

COLORS

for the plastic trade

◆

Get our samples

◆

BROOKLYN COLOR WORKS, Inc.

129-143 Cherry St. Brooklyn, N. Y.

COMPO-SITE, INC.

Molded Products

Compo Buttons for Men's and Women's Wear in attractive designs and colors.

•

Compo Bottle Tops for the Ink and Liquor Trade. 100% Bond to Corks guaranteed.

•

Compo Poker Chips FAMOUS JOCKEY CLUB Design—Nationally known.

•

Send us your requirements

Office and Works

207-215 Astor Street Newark, N. J.

GEO. J. CROSMAN, Pres.

Established 1910 *Service and Quality*

CHROMIUM PLATED DIES

BURR CHROMIUM COMPANY
INCORPORATED

Specialists

In the Polishing and Chromium Plating of Dies and Machine Tools

Send Your Blueprints for an Estimate

12-14-16 AMES STREET CAMBRIDGE, MASS.

BAKELITE MOLDS

Since 1918 expert designers and builders of Bakelite molds. Serving most of the leading molders in the country.

EAGLE TOOL & MACHINE CO.

37-39 Freeman Street - Newark, N. J.

Phone: Market 3-1572
1573

BOONTON MOLDING COMPANY

Boonton, New Jersey

Custom Molders

PHENOLICS
UREAS

A Complete Organization

NEW YORK OFFICE, 30 CHURCH STREET

Pyroxylin and Celluloid Waste Products

We buy and sell all kinds of Pyroxylin and Celluloid scrap, including sheets, rods and tubes.

LARRY GERING, Inc.

Office and Warehouses

243-51 Parkhurst St. Newark, N. J.

PLASTIC PATENTS

Coatings

Trade mark label, Heavy Duty Black Three-for-one Spray Lacquer. No. 43,558. Steelcote Mfg. Co., St. Louis, Mo.

Phenolic resinous reaction product, drying oil with cellulose ester as protective coating. No. 1,954,836. V. H. Turkington to Bakelite Corp., N. Y.

Laminated

Glass sheeting—cellulose acetate with coating of ethyl toluene sulfonamid-formaldehyde resin. No. 1,953,971. W. H. Moss, to Celanese Corp., N. Y.

Cell. ester plastic with non-water soluble cement, for composite glass. No. 1,954,053. M. L. Macht, to Duplate Corp., Del.

Apparatus for making composite glass. No. 1,956,168. E. L. Fix, and B. J. Dennison, to Duplate Corp., Del.

Binder fabric with opaque coating under heat & pressure, for laminated product. No. 1,956,314. W. W. Carter, Jr., to Formica Ins. Co., Cincinnati.

Machinery

Glass edge groover for laminated sheets with cell. plastic reinforcer. No. 1,954,057. J. G. Oliver, to Pittsburgh Plate Glass Co.

Glass groover with electric connections. No. 1,954,061. C. E. Smith, to Duplate Corp., Del.

Closures and machines and methods for capping containers. Nos. 1,954,208-217(10). G. W. Booth, to Crown Cork & Seal Co., Baltimore, Md.

Miscellaneous

Purification of phthalic anhydride formed by oxidation of naphthalene. No. 1,953,937. A. O. Jaeger, to Selden Res. & Eng. Corp., Pittsburgh.

Cellulose and rosin sound record, using same plasticizer. No. 1,954,026. Geo. Schneider, to Celanese Corp., N. Y. City.

Piston type fountain pen, reservoir barrel of plastic. No. 1,954,266. F. J. Schisler, Minneapolis, Minn.

Flexible glazed paper product, lustrous finish of thermoplastic cell. composition. No. 1,954,751. A. W. Bateman & R. E. Thomas, to du Pont & Co.

Self-filling fountain pen. No. 1,953,940. R. B. Kingman, Orange, N. J.

Self-filling fountain pen. No. 1,954,952. E. S. Sears, to Mabie, Todd & Co., London, Eng.

Method of joining thermoplastic insulation. No. 1,954,960. E. Studt, Germany; A. R. Kemp, N. J.; F. S. Malm, Chicago, to Felten und Guilleaume, Carlswerk, Ger., and Bell Tel. Labs., Inc., N. Y.

Production of artificial masses from polymerized vinyl alcohols & aliphatic aldehydes. No. 1,955,068. H. Hopff, Ludwigshafen & E. Kuehn, Mannheim, to I. G. F., Frankfort, Germany.

Method of cutting strip shingles. No. 1,956,285. N. P. Harshberger, to Bakelite Building Prod. Co., N. Y. City.

Patent Suit, March, No. 1,663,505. Grainless fiber product. Masonite Corp., vs. Faxon Lumber Co.

Trade mark, "Erinoplas," for synthetic or natural resin, cellulose, casein or bitumen compositions. No. 348,641. Erinoid, Limited, London, England.

Trade mark, for composite board, synthetic lumber, hard board. No. 312,580. Armstrong-Newport Co., Carrollville, Wisc.

Translucent sound record. No. 1,956,626. P. A. Robbins, Highland Park, Ill.

Sound record of polyvinyl alcohol-aldehyde condensation products. No. 1,956,837. F. Schmidt, Troisdorf, Germany.

Resinous felted fiber panel board. No. 1,956,866. C. L. Keller, to The Richardson Co., Lockland, Ohio.

Esters from sulfonated phthalic acids and aromatic hydroxyl-compounds. No. 1,957,155. O. Albrecht, to S'te Chem. Indus., Basel, Switz.

Carbon black in granules, to withstand disintegration. No. 1,957,314. E. Billings & H. H. Offutt, to Godfrey L. Cabot, Inc., Boston.

Trade mark for pyroxylin coated fabrics. No. 312,393. Columbus Coated Fabrics Corp., Columbus, O.

Phenol

Trade mark for laminated phenol fiber. No. 312,412. Franklin Fibre-Lamitex Corp., Wilmington, Del.

Process for fusible, potentially reactive phenol resin. No. 1,955,731. H. L. Bender, Bloomfield, to Bakelite Corp., N. Y.

Resins

Resin of an aldehyde with dihydroxy-benzophenone. No. 1,954,826. W. H. Moss, London, Eng., to Celanese Corp., N. Y.

Patent suit, resinous product, No. 1,893,873. Gen. Elec. Co. vs. Paramet Chem. Co.

Cold resinification of phenol alcohols. No. 1,956,530. F. S. Granger, to Combustion Utilities Corp., N. Y.

Resin; ethylene glycol derivative of phthalic acid & lactic acid. No. 1,956,559. T. F. Bradley, to Ellis-Foster Co., Montclair, N. J.

Abrasives

Abrasive grain surfaced with metal salts and sodium silicates. No. 1,951,555. J. S. Masin, to Swann Research, Birmingham, Ala.

Cellulose

Trademark "Cellochrome" for film forming material, etc. No. 343,669. Cellochrome Corp., Dover, Del.

Stannic halide esterification of cellulose. No. 1,950,663. H. Dreyfus, London, Eng.

Nonhalation film backing, dye and stabilizing colloid. No. 1,950,890. K. C. D. Hickman & C. R. Sanford, to Eastman Kodak Co., Rochester, N. Y.

Cementing agent for cellulosic plastics. No. 1,950,954. Jas. F. Walsh & A. F. Caprio, to Celluloid Corp., Newark, N. J.

Cellulose organic ester composition. No. 1,950,907. C. J. Staud & T. F. Murray, Jr., to Eastman Kodak Co., Rochester, N. Y.

Active charcoal, for purification & decoloration of various solutions with colloidal impurities—cel. dissolved by zinc chloride, hydrochoric acid. No. 1,951,538. G. J. L. Tielens, to Ste. Anon. "Maximine," Belgium.

Translucent aqueous cell. base, with various physical & fotochemical properties from solution with 12 chemicals. No. 1,951,933. F. W. Hochstetter, Pittsburgh, Pa.

Cellulose xanthate viscose solution. No. 1,952,604. H. H. Parker, Kenmore, N. Y.

NORMAL - CONCENTRATED - PROCESSED

Heveatex

RUBBER LATEX

Always In Stock For Immediate Delivery

HEVEATEX CORPORATION
78 GOODYEAR AVE.
MELROSE, MASS.

IMC

Dependable Molding Service
All Makes of Materials

IMPERIAL MOLDED PRODUCTS CORP.
2925 West Harrison Street
Chicago, Ill.

Phenol

CHEMICALS OF QUALITY
Monsanto
ST. LOUIS, U.S.A.

Importers
Wood Flour
Various Grades
From 25 to 100 Mesh
Suited to Your Own Formulas

STATE CHEMICAL COMPANY
80 West Houston St., New York City

NEWARK DIE COMPANY
INCORPORATED

We Specialize on Molds for Plastic Materials
Die sinking, Engraving, Hydraulic Hobbing

24 SCOTT STREET
Newark, New Jersey

Pigment Colors and Color Lakes
of
Proven Efficiency and Adaptability
for
All Types of Molding Compounds
and
General Plastic Formulation
Offered By

PAUL UHLICH & COMPANY, Inc.
157 Chambers Street New York, N. Y.

We SPECIALIZE in
Experimental and Limited Production
— MOLDING —

Having our own Design and Mold Construction Departments, in addition to a modern press room, we are able to give complete service. If you have an idea for a molded product, let us assist you in its development. Our methods insure inexpensive sample molds and satisfactory moldings.

BAY STATE MOULDING CO., INC.
1191-1199 Dorchester Ave., Boston, Mass.

REBUILT GUARANTEED
MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

All sizes: Hydraulic Presses, Accumulators, Pumps, Jacketed Mixers, Mills, Extruders, Sheeters, Tablet Machines, Kettles, Motors, Miscellaneous Equipment.

WIRE • PHONE • WRITE

UNITED RUBBER MACHINERY EXCHANGE
319 Frelinghuysen Ave.
NEWARK, N. J.
Cable Address
"URME"

Thermoplastic material from cell. derivative, plastifier & a resin. No. 1,952,696. S. Whyte & W. E. Lord, to Elec. & Musical Ind., Hayes, England.

Carboxylic acid esters of cell. No. 1,952,843. H. Dreyfus, London.

Trademark "Tortalette" for cell. acetate composition of buckles, pens, lacquer vases, etc. No. 343,775. H. Goodman & Son, Inc., N. Y.

Cell. adhesive, with glycerine & agglutinant. No. 1,953,-104. Church, Hyden & Finzel, Buffalo, to Du Pont Cellophane Co., N. Y.

Process of refining cellulose. No. 1,953,191. G. A. Richter, to Brown Co., Berlin, N. H.

Alkaline treatment with H peroxide, of cell. esters, No. 1,953,398. R. E. Eskew, to DuPont Viscoloid Co., Leominster.

Woven paper-strand imitation straw, waterproofed with cell.-gum lacquer. No. 1,953,697. E. Witcoff, to Caradine Hat Co., St. Louis, Mo.

Films of acetone-soluble cell. acetate. No. 1,950,665. H. Dreyfus, London, England.

Coatings

Coating composition of vinyl & cellulose for metallic screens. No. 1,950,662. Camille Dreyfus, New York.

Adherent, shock-resistant coating, using pulverized carborundum. No. 1,950,820. Schmidt & Deseniss, to Tornesit Gess., Hamburg, Germany.

Chorinated rubber & diphenyl with solvent for metallic coating. No. 1,950,894. Wm. Koch, to Hercules Powder Co., Wilmington, Del.

Composition for coating using polymerized ester of ethylene dicarboxylic acid. No. 1,945,307. H. B. Dykstra, to du Pont Co., Del.

Cresylic acid aldehyde—China wood oil product for infusible coating or saturating material. No. 1,952,725. I. J. Novak, to Raybestos-Manhattan, Inc., Bridgeport, Conn.

Coating & protective composition. No. 1,953,508. O. Schober, Ger., to American Lurgi Corp., N. Y.

Titanium phosphate pigment. No. 1,953,777. B. D. Saklatwalla, H. E. Dunn, & A. E. Marshall, to Southern Minerals Products Corp., N. Y.

Laminated

Production of cellulosic plastic sheets to be used in laminated glass. No. 1,951,853. J. F. Walsh, to Celluloid Corp., N. J.

Laminated fibrous board. No. 1,951,983. W. P. Kellett, Jr., N. Y.

Impregnated, fibrous silent gears. No. 1,952,811. R. W. Lytle, to Formica Insul. Co., Cincinnati.

Heat-hardening resinous base laminating material. No. 1,953,111. H. F. Horne, to Westinghouse Co., Pittsburgh, Pa.

Process & apparatus for sealing lam. glass. No. 1,953,-344. F. Fraser, to Libbey-Owens-Ford, Toledo, Ohio.

Machinery

Extrusion press, spraying into divided mold. No. 1,952,-241. P. Eckert, to Eckert & Ziegler, Cologne, Germany.

Apparatus for making containers from cell. sheets. No. 1,953,122. J. M. Munson & L. A. Becker, to Du Pont Cellophane Co., N. Y.

Miscellaneous

Design for button. No. 91,603. L. R. Carley, to Patent Button Co., Waterbury, Conn.

Di-thiophosphate compounds. No. 1,949,629. C. J. Romieux & K. D. Ashley, to Am. Cyanamid Co., N. Y.

Roof covering and its formation. No. 1,949,907. N. P. Harshberger, Cal., to Bakelite Building Prod. Co., N. Y.

Friction facing, of fibrous material, lubricant & resinoid. No. 1,950,262. R. J. Norton, to Bendix Brake Co., Indiana.

Laminated core stator, with acid-proof thermoplastic insulation. No. 19,106. Reissue from 1931. V. G. Apple Estate, Dayton.

Design for combination ash-tray, card-holder, etc. No. 91,788. John G. Rossiter, to Reynolds Spring, Jackson, Mich.

Alkaline reacted cashew nut liquid & casein mineral. No. 1,952,313. M. T. Harvey, to Harvel Corp., N. J.

Dicyandiamide & a proteid condensed with formaldehyde under heat. No. 1,952,941. Kurt Ripper, Berlin.

For elec. insulation, cellulosic base with inherently flexible-phenolic resinoid. No. 1,953,892. H. L. Bender, to Bakelite Corp., N. Y.

Phenol

Production of alkyl phenols. No. 1,948,287. H. E. Buc & R. Schuler to Standard Oil Dev. Co., Del.

Production of phenolphthalein. Nos. 1,940,494-5. M. H. Hubacher, to Kavalco Prod. Inc., Nitro, W. Va.

Methylene dichloride & sodium phenate phenoplastic. No. 1,950,516. C. F. Prutton, to Dow Chem Co., Mich.

Mono & dichlor isomers of diphenyl. No. 1,951,577. J. E. Malowan, to Swann Res., Inc., Birmingham, Ala.

Workable masses from phenolformaldehyde condensation. No. 1,952,243. F. Frick, to I. G. F., Frankfort, Germany.

Trade-mark registered, phenolic compositions. No. 311,721. Sharples Solvents Corp., Philadelphia, Pa.

Resins

Alkyd resinous product. No. 1,950,468. F. Zwilgmeyer, to Nat. Aniline & Chem. Co., N. Y. City.

Resin bonded wheel. No. 1,950,641. F. A. Upper, to Bakelite Corp., N. Y.

Resinous solids from aldehyde reactions. No. 1,952,059. C. Ellis, to Ellis-Foster Co., Montclair, N. J.

Resin-acid compositions. No. 1,952,367. E. Fonrobert & F. Lemmer, to Resinous Prod. & Chem. Co., Philadelphia.

Synthetic resinoid, glyceride-dihydric alcohol-phthalic anhydride. No. 1,952,412. T. F. Bradley, to Ellis-Foster Co., Montclair, N. J.

Oil-soluble synthetic resins. No. 1,952,676. G. Kranzlein & A. Voss, to I. G. F., Frankfort, Germany.

Artificial fabric resinated by vinyl ester polymer. No. 1,953,083. W. E. Lawson, to du Pont Co., Del.

Polybasic acid-polyhydric alcohol resinous composition. No. 1,953,583. T. F. Bradley, to Am. Cyanamid Co., N. Y.

Urea

Condensation product from dimethylolureas. No. 1,947,-997. Martin Luther, to I. G. F., Frankfort, Germany.

Urea condensation product. No. 1,950,746. Fritz Pollak, Vienna, to Synthetic Plastics, Inc., N. Y.

Urea-aldehyde plasticized resin. No. 1,951,526. E. E. Novotny & W. W. Johnson, to J. S. Stokes, Huntingdon Valley, Pa.

Urea/thiourea-dicyandiamide-formaldehyde molding powder. No. 1,951,772. Kurt Ripper, Berlin, Germany.

Urea & formaldehyde condensation products. No. 1,952,-598. Luther, Pungs & Heuck, to I. G. F., Frankfort, Germany.

Thermoplastic product of wood fiber & urea. No. 1,953,-832. O. W. Sandell, Stockholm, to Akt. M. O. D. Wallboard Co., Sweden.

ADVERTISERS' INDEX

	Page
American Cyanamid & Chemical Corp.	Cover 4
American-British Chemical Supplies, nc.	228
American Catalin Corp.	201
American Plastics Corp.	222
American Record Corp.	230
Auburn Button Works, Inc.	232
Bakelite Corporation	205
Bay State Moulding Co., Inc.	238
Becker-Moore Co.	230
Boonton Molding Co.	236
Brooklyn Color Works, nc.	236
Burr Chromium Co.	236
Calco Chemical Co.	Cover 2
Cavagnaro, John J.	224
Chemical Economics	Cover 3
Chicago Molded Products Corp.	234
Church & Morse, Inc.	232
Claremont Waste Mfg. Co.	234
Commercial Solvents Corp.	204
Compo-Site, Inc.	236
Consolidated Products Corp.	234
du Pont de Nemours & Co., E. I.	224
Eagle Tool & Machine Co.	236
General Electric Co.	Insert facing page 221
General Plastics, Inc.	206
Gering, Larry, Inc.	236
Hercules Powder Co.	232
Heveatex Corp.	238
Heyden Chemical Co.	226
Imperial Molded Products Corp.	238
Kessler Chemical Co.	222
Kuhn & Jacob Molding & Tool Co.	232
Loomis, Evarts G.	236
Makalot Corp.	230
Marblette Corp.	203
Monsanto Chemical Co.	238
National Aniline & Chem. Co., Inc.	228
Newark Die Co.	238
Pfaltz & Bauer, Inc.	240
Resinox Corporation	226
Siemon Co., The	240
Standard Tool Co.	234
State Chemical Co., Inc.	238
Synthane Corp.	208
Tennessee Eastman Corp.	207
Uhlich, Paul, & Co.	238
United Rubber Machinery Exchange	238
Watertown Mfg. Co., The	240

A COMPLETE CUSTOM MOLDING SERVICE

—One of the Oldest Plants in the Country

—Yet Up-to-the-Minute in Equipment and Service

Moulders of the new compound

HARVITE

THE SIEMON COMPANY

Bridgeport Connecticut

A COMPLETE CUSTOM MOLDING SERVICE

—An Extensive, Modernly Equipped, Molding Plant and Tool Room

—All inquiries given prompt attention by our Engineering Dept.

Molders of All Commercial Compounds

NEILLITE

Custom Material for Custom Molding

THE WATERTOWN MFG. CO.

300 Echo Lake Road Watertown, Conn.

Pure
Extra White

Sodium Hydroxide
Potassium Hydroxide

Sticks and Pellets

PFALTZ & BAUER, INC.

300 Pearl Street New York City

Send for list of Laboratory Specialties—Balances, Microscopes, etc.

Classified Advertising

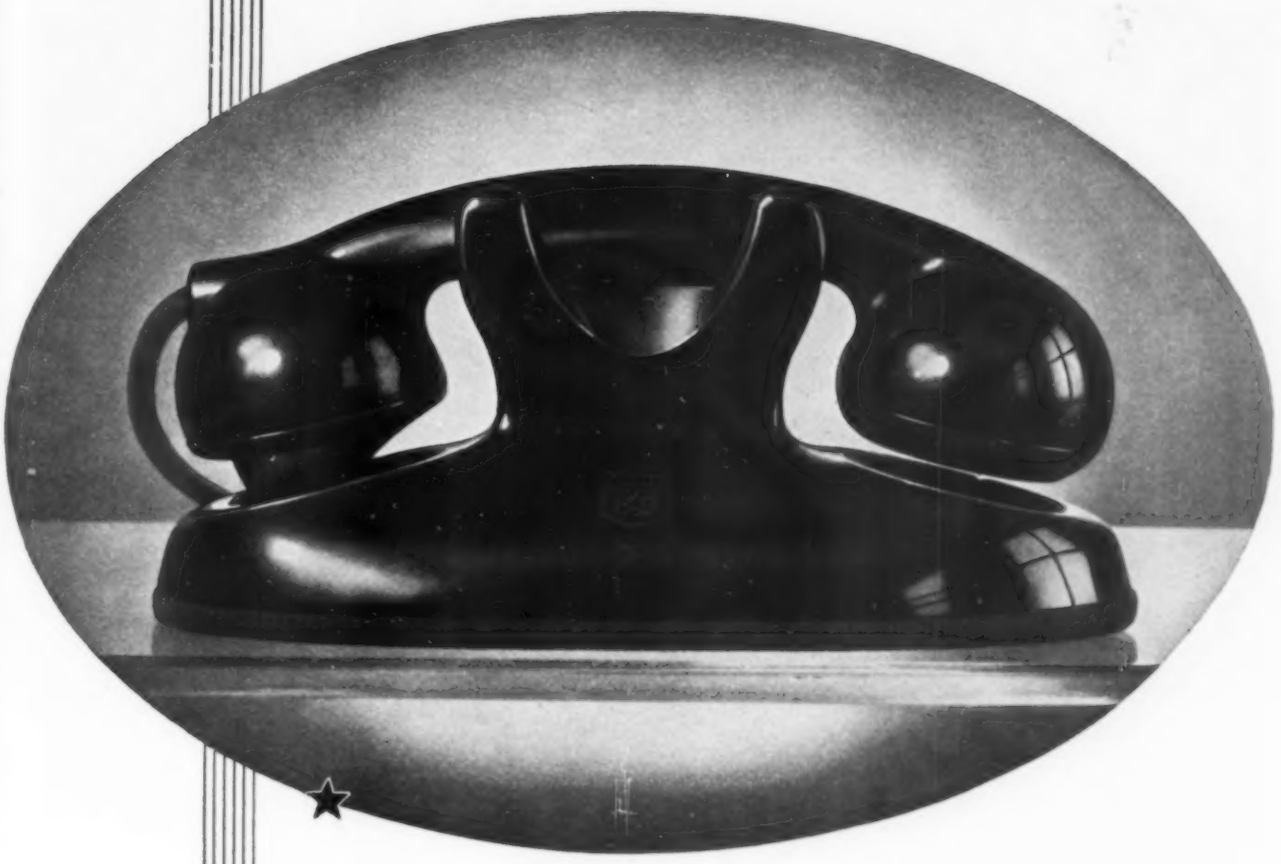
Rates for classified advertising, per issue, are $1.00 for 20 words or less; 5c for each additional word. 10c for forwarding mail if box number is used. Payment must be enclosed with order, which must be received by publishers no later than the 20th of preceding month.

FOR SALE: Cellulose Acetate Dope (9 oz. solution) 5,000 gals. in steel drums; cheap. Henry K. Fort, Widener Bldg., Philadelphia, Pa.

WANTED—Cast Phenol Technician, with practical experience in producing Phenolic Casts. State experience and salary desired. Box 629, Plastic Products.

AVAILABLE—Engineer of Electrical Insulations with nine years experience as works engineer with large electrical concern. Research work in the formulation and application of varnishes moulded products and laminated materials. Position desired with organization producing synthetic resins or materials for the electrical industry. Married, 29 years old, Salary $3,000. Box 630, Plastic Products.

WANTED—Tablet Press. Stokes Model T, R or H, or Colton No. 4½. Give age, condition, price and where available for inspection. Box 631, Plastic Products.



Stream-lined...

...of Bakelite Molded to conform to the current trend in product design

IN THE MASTERPHONE, the Kellogg Co. aimed to produce a desk set that would excel in efficiency, and also be most pleasing in appearance. An important factor in attaining this objective was the use of Bakelite Molded for base and hand set.

The entire base, including cradle, is formed of Bakelite Molded in one piece. The hand set, too, is formed of the same material in one piece, except for the rings which hold the removable mouthpiece and transmitter in place. The permanent luster and fadeless black of Bakelite Molded contribute in no small measure to the beauty of the instrument.

Because of the beauty of Bakelite Molded, the many attractive colors available, and the accuracy with which the designers' models may be produced, it is being used for improving the appearance and increasing the saleability of innumerable products. Our engineers would be glad to consult with you about the sales promoting possibilities of Bakelite Molded for your own product. We also invite you to write for our interesting and profusely illustrated booklet 22M, "Bakelite Molded."

★*MASTERPHONE with both stand and hand set of Bakelite Molded. A product of Kellogg Switchboard & Supply Co., Chicago, Ill.*

BAKELITE CORPORATION, 247 Park Avenue, New York, N.Y....43 East Ohio Street, Chicago, Ill.
BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Ontario, Canada

BAKELITE

The registered trade marks shown above distinguish materials manufactured by Bakelite Corporation. Under the symbol "B" in the circle, the numeral may be infinite, an unlimited quantity, it symbolizes the infinite number of present and future uses of Bakelite Corporation's products.

THE MATERIAL OF A THOUSAND USES

ADVERTISERS' INDEX

	Page
American Cyanamid & Chemical Corp.	Cover 4
American-British Chemical Supplies, nc.	228
American Catalin Corp.	201
American Plastics Corp.	222
American Record Corp.	230
Auburn Button Works, Inc.	232
Bakelite Corporation	205
Bay State Moulding Co., Inc.	238
Becker-Moore Co.	230
Boonton Molding Co.	236
Brooklyn Color Works, nc.	236
Burr Chromium Co.	236
Calco Chemical Co.	Cover 2
Cavagnaro, John J.	224
Chemical Economics	Cover 3
Chicago Molded Products Corp.	234
Church & Morse, Inc.	232
Claremont Waste Mfg. Co.	234
Commercial Solvents Corp.	204
Compo-Site, Inc.	236
Consolidated Products Corp.	234
du Pont de Nemours & Co., E. I.	224
Eagle Tool & Machine Co.	236
General Electric Co.	Insert facing page 221
General Plastics, Inc.	206
Gering, Larry, Inc.	236
Hercules Powder Co.	232
Heveatex Corp.	238
Heyden Chemical Co.	226
Imperial Molded Products Corp.	238
Kessler Chemical Co.	222
Kuhn & Jacob Molding & Tool Co.	232
Loomis, Evarts G.	236
Makalot Corp.	230
Marblette Corp.	203
Monsanto Chemical Co.	238
National Aniline & Chem. Co., Inc.	228
Newark Die Co.	238
Pfaltz & Bauer, Inc.	240
Resinox Corporation	226
Siemon Co., The	240
Standard Tool Co.	234
State Chemical Co., Inc.	238
Synthane Corp.	208
Tennessee Eastman Corp.	207
Uhlich, Paul, & Co.	238
United Rubber Machinery Exchange	238
Watertown Mfg. Co., The	240

A COMPLETE CUSTOM MOLDING SERVICE

—One of the Oldest Plants in the Country

—Yet Up-to-the-Minute in Equipment and Service

Moulders of the new compound

HARVITE

THE SIEMON COMPANY

Bridgeport Connecticut

A COMPLETE CUSTOM MOLDING SERVICE

—An Extensive, Modernly Equipped, Molding Plant and Tool Room

—All inquiries given prompt attention by our Engineering Dept.

Molders of All Commercial Compounds

NEILLITE

Custom Material for Custom Molding

THE WATERTOWN MFG. CO.

300 Echo Lake Road Watertown, Conn.

Pure
Extra White

Sodium Hydroxide
Potassium Hydroxide

Sticks and Pellets

PFALTZ & BAUER, INC.

300 Pearl Street New York City

Send for list of Laboratory Specialties—Balances, Microscopes, etc.

Classified Advertising

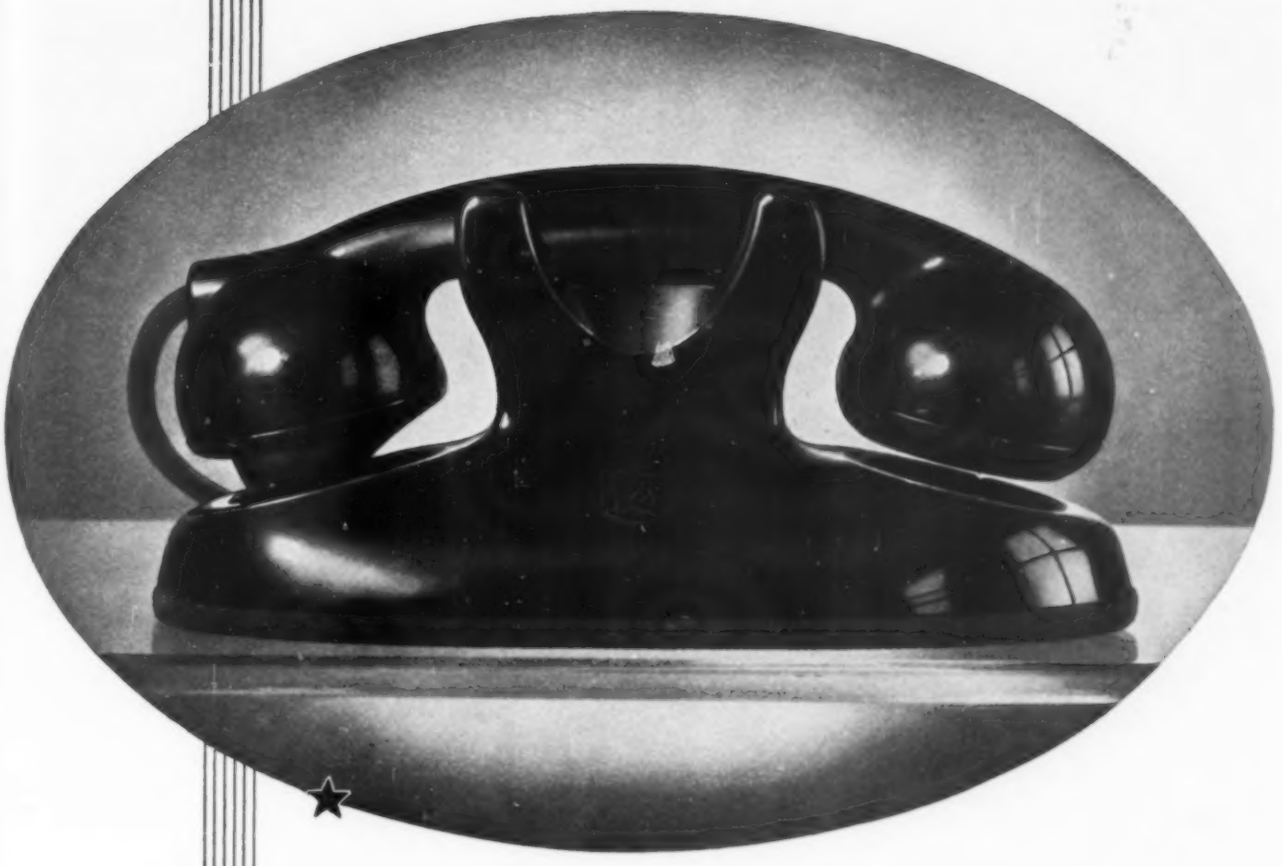
Rates for classified advertising, per issue, are $1.00 for 20 words or less; 5c for each additional word. 10c for forwarding mail if box number is used. Payment must be enclosed with order, which must be received by publishers no later than the 20th of preceding month.

FOR SALE: Cellulose Acetate Dope (9 oz. solution) 5,000 gals. in steel drums; cheap. Henry K. Fort, Widener Bldg., Philadelphia, Pa.

WANTED—Cast Phenol Technician, with practical experience in producing Phenolic Casts. State experience and salary desired. Box 629, Plastic Products.

AVAILABLE—Engineer of Electrical Insulations with nine years experience as works engineer with large electrical concern. Research work in the formulation and application of varnishes moulded products and laminated materials. Position desired with organization producing synthetic resins or materials for the electrical industry. Married, 29 years old, Salary $3,000. Box 630, Plastic Products.

WANTED—Tablet Press. Stokes Model T, R or H, or Colton No. 4½. Give age, condition, price and where available for inspection. Box 631, Plastic Products.



Stream-lined...

...of Bakelite Molded to conform to the current trend in product design

IN THE MASTERPHONE, the Kellogg Co. aimed to produce a desk set that would excel in efficiency, and also be most pleasing in appearance. An important factor in attaining this objective was the use of Bakelite Molded for base and hand set.

The entire base, including cradle, is formed of Bakelite Molded in one piece. The hand set, too, is formed of the same material in one piece, except for the rings which hold the removable mouthpiece and transmitter in place. The permanent luster and fadeless black of Bakelite Molded contribute in no small measure to the beauty of the instrument.

Because of the beauty of Bakelite Molded, the many attractive colors available, and the accuracy with which the designers' models may be produced, it is being used for improving the appearance and increasing the saleability of innumerable products. Our engineers would be glad to consult with you about the sales promoting possibilities of Bakelite Molded for your own product. We also invite you to write for our interesting and profusely illustrated booklet 22M, "Bakelite Molded."

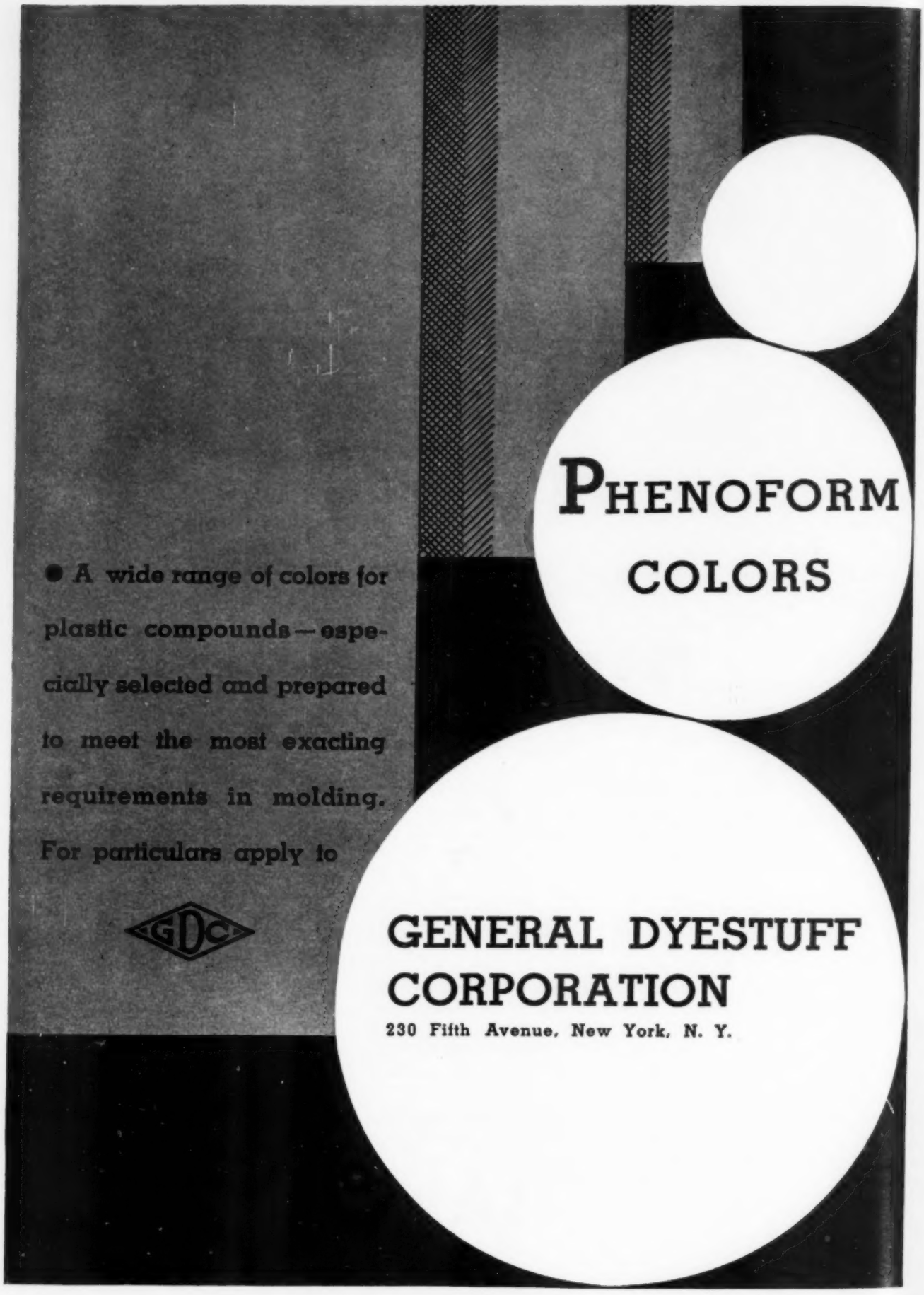
★*MASTERPHONE with both stand and hand set of Bakelite Molded. A product of Kellogg Switchboard & Supply Co., Chicago, Ill.*

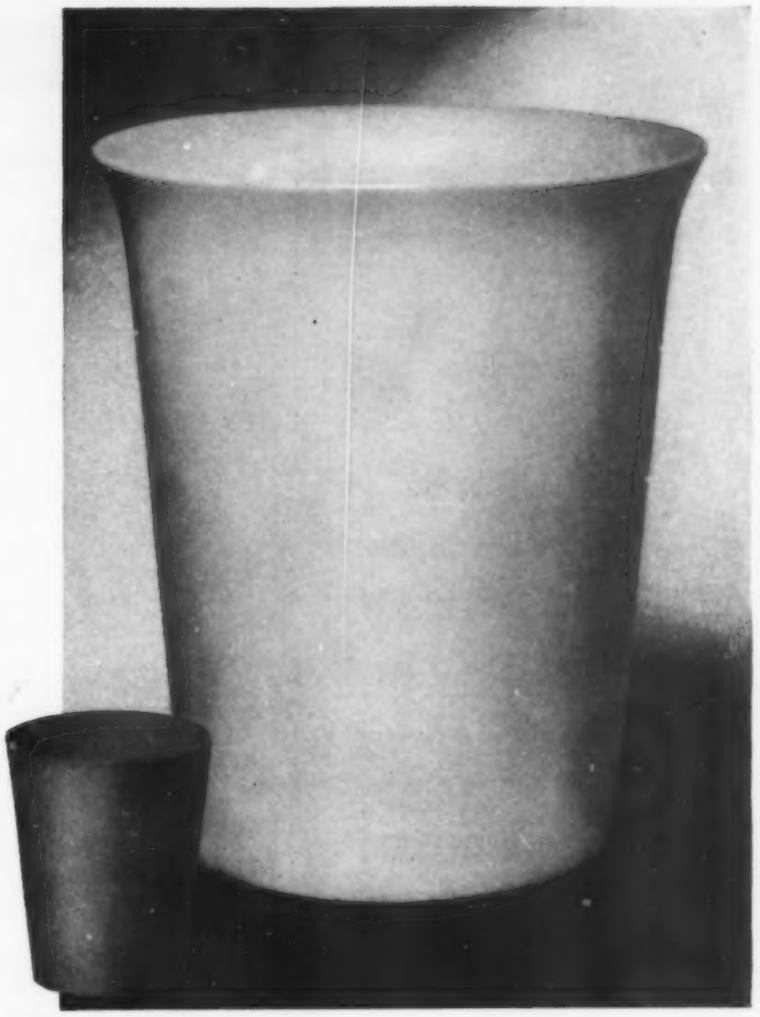
BAKELITE CORPORATION, 247 Park Avenue, New York, N.Y....43 East Ohio Street, Chicago, Ill.
BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Ontario, Canada

BAKELITE

The registered trade marks shown above distinguish materials manufactured by Bakelite Corporation. Under the symbol "B" is the numerical sign for infinity, an unlimited quantity. It symbolizes the infinite number of present and future uses of Bakelite Corporation's products.

THE MATERIAL OF A THOUSAND USES


PHENOFORM
COLORS
● A wide range of colors for plastic compounds — especially selected and prepared to meet the most exacting requirements in molding. For particulars apply to
GDC
GENERAL DYESTUFF CORPORATION
230 Fifth Avenue, New York, N. Y.



A THIMBLE-FULL
OR A
LONG TALL ONE

BEETLE can be molded

paper-thin or thick-walled

The two tumblers illustrated show the long and short of Beetle's versatility. Between Die-Molding's 26-oz. Malted Milk tumbler that stands the rough handling of a busy soda-jerker, and Kurz-Kasch's paper-thin "Whoopee-Cup" (that comes in a nested set of six for thirsty football fans) there's an almost endless variety of sizes, shapes and colors that can be molded of Beetle.

Beetle Molding Powder comes in two types: Granular for tableting; fine powder which can't be tableted but costs less and makes smoother surfaces. Let our engineers help you with your technical molding problems. BEETLEWARE moldings offer you greater profits—quote them first!

NOTE TO TRADE MOLDERS

In 1933 over $4,000,000.00 worth of urea moldings were added to the industry's output of molded products. Are you getting your share of this "new business?"

SYNTHETIC PLASTICS COMPANY
535 Fifth Avenue New York City
A Unit of American Cyanamid Company

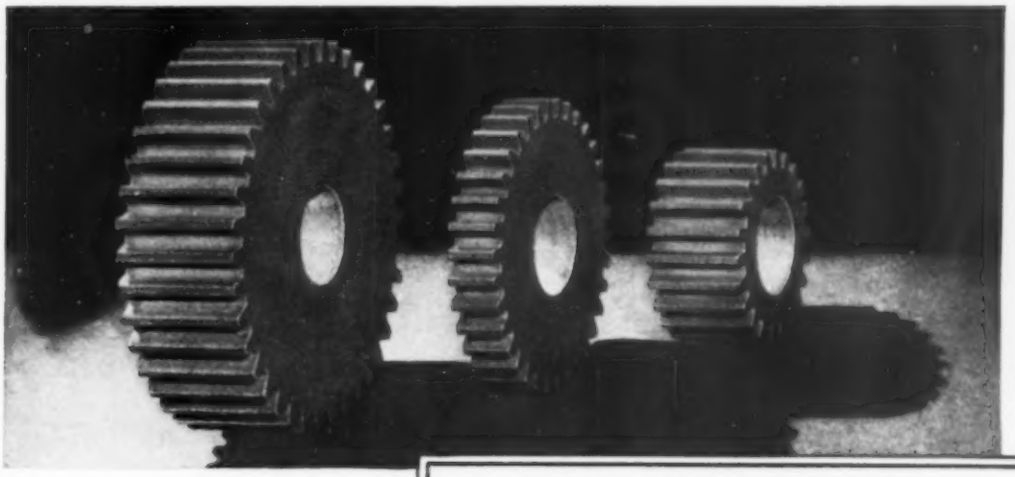
THE GREATEST MARKETS ARE STILL UNTOUCHED!
THE PROFITS OF RE-DESIGN
THERE HAVE BEEN so many cases where products redesigned with Durez have increased sales, that it seems a bit superfluous to point out the advantages.
But there are still many good products that are handicapped by clumsy design and inferior or incorrect materials. Why not check over your own product, to see whether modern, practical design and versatile, good-looking Durez couldn't make it more appealing and easier for your customer to use? We'll be glad to help you with production problems, put you in touch with designers, and give you molding-cost figures. General Plastics, Inc., 402 Walck Road, North Tonawanda, New York.
DUREZ OFFERS 14 DISTINCT ADVANTAGES:
1. Light
2. Strong
3. Heat proof
4. Dust proof
5. Peel proof
6. Chip proof
7. Corrosion proof
8. Dielectric strength
9. Variety of colors
10. Permanent luster
11. Chemically inert
12. Insoluble in alcohol
13. Odorless and tasteless
14. Natural finish; needs no polishing
Durez
THE MODERN MOLDING COMPOUND
WESTON EXPOSURE METER . . . compact, simple design. Durez was selected for the case because it will not bend or warp, or in any way affect the correct function of the delicate instrument. And because Durez' good-looking finish is permanent.
GAS STOVE . . . Norman Bel Geddes has done a practical, as well as smart, design for this stove. And the manufacturers have done a good job of material selection, too, for the oven-door pulls are made of Durez so that they'll never get too hot to touch.
SYRINGE CUT-OFF . . . re-designed, and molded of Durez, it's a great improvement over the old corroding, hard-to-work metal ones. Because Durez is light, strong, good-looking, and not affected by water — it was the ideal material for this job.
TYPEWRITER . . . Durez for the cover, space-bar and knob because it has the strength to withstand the knocks and punishment that these parts of the machine receive. Also because Durez' good-looking finish will last the life of the typewriter.

★ The advertisement reproduced above appeared in the February issue of Product Engineering. It shows designers and engineers how all types of products can be improved by the use of molded plastics. Similar advertisements, specially designed for each field, appear every month in the trade papers that reach all types of potential buyers of molded plastic products.

EVERY DAY sees industry making wider use of molded plastics, and yet . . . we've scarcely scratched the surface! For the undeveloped applications of this modern material seem almost inexhaustible. There are thousands of products that could —and should—be improved by the use of molded parts. The amount that these markets will be developed depends only on the amount of sales effort and educational work done by those who comprise the molding industry. It is up to them to sell the new uses for, and the advantages of, molded plastics. Toward that end General Plastics, Inc. is doing three things: advertising extensively in magazines that reach industrial designers, engineers, and manufacturers; suggesting new uses for plastics; and above all, providing molders with a compound that, with its 14 advantages, will do all that industry asks of a molded part. We are confident that the molding industry's past, brilliant as it has been, will be far outshone by its future! General Plastics, Inc., 402 Walck Rd., No. Tonawanda, N.Y.

DUREZ THE MODERN MOLDING COMPOUND

Does Your Product Have to Stand Heavy Impact Loads?



IF SO, USE TEXTOLITE

Resilience of Textolite as Compared with Other Materials

Material	Strength Lb. per Sq. In.		Elastic Modulus
Steel	80,000		30 x 10^6
Cast Iron	90,000	(compressive)	14 x 10^6
Cast Iron	18,000	(tensile)	14 x 10^6
Aluminum	20,000		10 x 10^6
Phosphor Bronze	40,000		13 x 10^6
Textolite	40,000	(compressive, flatwise)	0.8 x 10^6
Textolite	26,000	(compressive, edgewise)	0.8 x 10^6
Textolite	10,000	(tensile)	1.0 x 10^6

If your product—like the Textolite gears shown above—must stand up under the stresses of heavy impact loads, it will pay you to use a material of high resilience. ● Forty times as resilient as steel (see table above), Textolite has made these gears permanently quiet and unusually long-lived. Compared with gears of rigid metals, they have, because of their resilience, lower impact- and acceleration-load stresses incident to normal gear-tooth action. ● Resilience is but one of the twelve primary properties of Textolite; high ratio of strength to weight, resistance to corrosion, no scoring or adhering to metals, and ease of fabrication are a few more. There are many grades of Textolite, each of which has a particular combination of these properties. Let us help you select the grade to fit your needs. Plastics Dept., General Electric Company, West Lynn, Mass.

NRA WE DO OUR PART

Textolite—A Plastic Material Molded by General Electric

GENERAL ELECTRIC

In this handy illustrated booklet you will find many interesting applications of G-E plastic products. Send this coupon for your copy.

SEND FOR THIS FREE BOOKLET

PLASTICS DEPT., GENERAL ELECTRIC, RIVER WORKS, WEST LYNN, MASS.

Please send me a copy of PLASTIC PRODUCTS, GEA-1429.

NAME .....

COMPANY .....

ADDRESS .....

943-2

Discriminating Manufacturers
INSIST ON REAL MARBLETTE

Each month the demand for Marblette increases and for the past twenty-four months we have been adding equipment and floor space to our plant. Our production has been increased five hundred per cent. and our equipment and floor space proportionately. Regardless of what you manufacture, a touch of Real Marblette to your product will add to its beauty and attractiveness thereby increasing your sales.

We are now making 190 colors in over 200 standard and special shapes. We may have a suggestion for anything you have in mind regarding the application of Marblette to your line.

Write for Color Chart, Dimension Sheet, written working instructions and complete list of colors.

Office and plant all under one roof, insuring prompt service. Ten minutes from Grand Central Station.
37-21 Thirtieth Street, Long Island City, N. Y., Telephone IRonsides 6-8262

Western Office
8647 Woodward Ave.
Detroit, Mich.
Tel., Madison 7052

The **MARBLETTE** *Corporation*

New England Office
Marion Road
Westport, Conn.
Tel., Westport 4055